tinct in the early tertiary epoch as they are now. It is in accordance with this supposition that the remains of *Alectoropodes*, but not of *Peristeropodes*, have been found in the older tertiary deposits of Europe.

I watch the progress of M. Alphonse Milne-Edwards's researches with great interest, to know whether Parrots, Pigeons, *Dromæidæ*, and *Rheidæ* occur in force, or at all, among the miocene birds. If they are absent from the miocene fauna of Arctogæa, it will be necessary to suppose that these groups of birds are of sufficiently ancient origin to have been segregated, even before the miocene epoch, in Austro-Columbia and Australasia, whence they have subsequently colonized parts of Arctogæa; while, on the other hand, their presence in European miocene formations will render it possible that the colonization has taken place the other way, and that these birds have attained their wonderful multiplicity and diversity of forms in Austro-Columbia and Australasia simply in consequence of the very favourable nature of the conditions to which they have been exposed in that country.

I confess I incline to the latter supposition. The distribution of *Psittacula*, for instance, is quite unintelligible to me upon any other supposition than that this genus existed in the miocene epoch, or earlier, in Northern Arctogæa, and has thence spread into Austro-Columbia, South Africa, India, and the Papuan islands, where it is now found.

May 28, 1868.

George Busk, Esq., F.R.S., V.P., in the Chair.

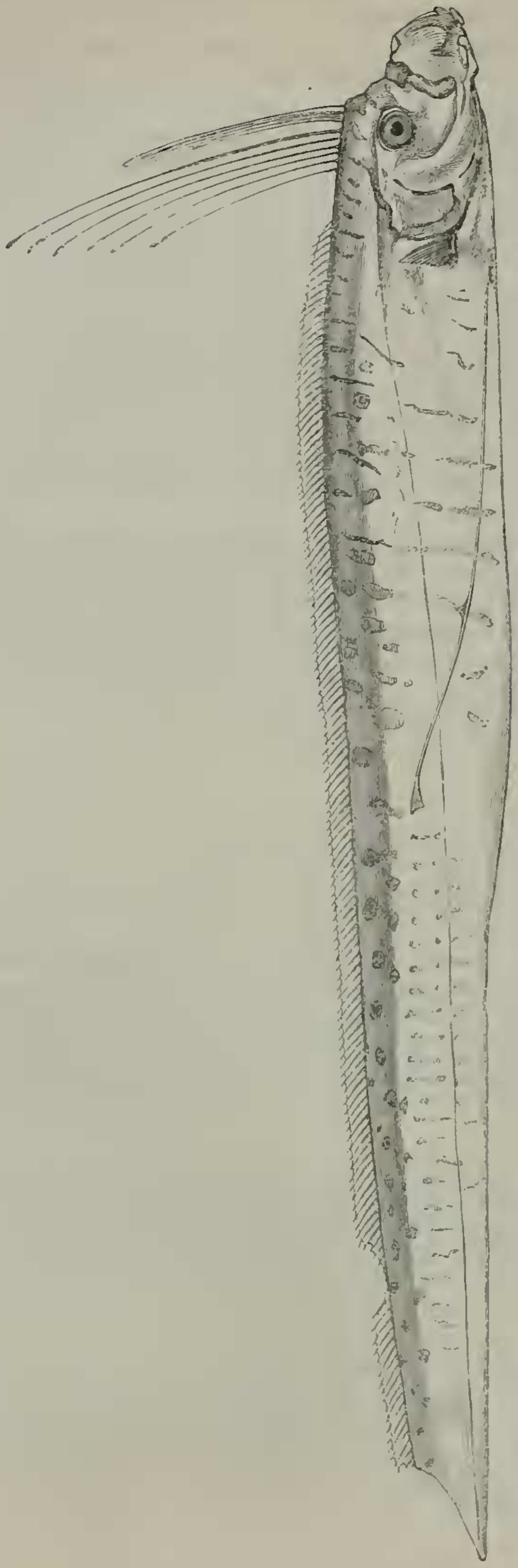
The Secretary reported that two living examples of Owen's Apteryx (*Apteryx owenii*), destined for the Society's Menagerie, had been recently shipped from Australia (one by Dr. George Bennett, F.Z.S., of Sydney, and the other by Mr. E. S. Hill, C.M.Z.S., of Wollahra, Sydney), but that they had both, unfortunately, died on the voyage home.

Dr. Günther exhibited specimens of the ova and young of the Axolotl (*Siredon mexicanum*) which had been deposited and hatched in a freshwater tank in this country, and made remarks on the strange facts connected with the development of this animal and its systematic postion.

The following letter was read, addressed to the Secretary by Mr. E. L. Layard, of Cape Town, F.Z.S.:—

"South-African Museum, Cape Town,
Cape of Good Hope, February 1868.

"Sir,—Herewith I forward, for the purpose of being laid before



Gymnetrus capensis (?), from sketches by Mr. D. Krynauw.

the Society, a description, together with some sketches by my friend Mr. D. Krynauw, of a fine *Gymnetrus*, which came ashore alive on the beach at Pappendorp, a little below Cape Town, in Table Bay, a few days ago.

"The extreme length was 10′ 2″, breadth 1′ 2″, thickness $2\frac{1}{2}''$; height of back fin $2\frac{1}{2}''$; length of ventral fins 3′ 8″, of filaments on head 2′ 1″, pectoral fin 3″, from vent to end of body 4′ 9″; head and mouth extended 11″; body just across the vent 10″. Ends of ventral fins broadly spatulate; the whole fin furnished with a narrow membrane on the upper side, which at about two-thirds of the length rose up into a triangular-shaped peak. The filaments on the head were also slightly spatulate. I take them to be modifications of the dorsal fin, and as such I shall write of them. First dorsal long and strongest; second, third, fourth, and fifth thinner, and joined to the first by a thin membrane of a light pink colour with dark pink spots on it; sixth longest of all; seventh, eighth, ninth, tenth, eleventh, and twelfth graduated, smaller from the sixth, and only united at their bases by a thin membrane. The proper dorsal extended from the shoulder to near the end of the body (as shown in the figure, p..320), the body then sloped away to the tail, which was wanting, the end vertebra being exposed, having been apparently bitten off; it was, however, very minute, and could only have supported a very small tail—probably a single filament. The general colour was white silvered over. There was a streak on the back, $3\frac{1}{2}''$ wide, of a pale blue black; and in this were the chief markings. The first third was striped with rather dark streaks, the last two-thirds with blotches of bluish brown. The parts just below the edge of the gill-covers black. Dorsal fin (including long filaments) rich pink vermilion, changing into orange at the base of last third of the length; ventral fins also of the same colour, the spatulate ends very dark. Eye white, with black centre, total diam. $1\frac{3}{4}''$. Medial line raised and strongly marked. Four rows of slighly raised small dusky specks ran the whole length of the body. Scales none. Teeth none. Mouth opening and shutting like the hood of a phaeton! Gill-covers hard bony plates; sides of the mouth the same. Sex ♀. On opening the fish to preserve it, it was found full of spawn from the head to the vent. This consisted of clear transparent globules, not unlike frog-spawn, but without the black dot. The stomach about 1′ long, and a simple bag full of some yellow matter. The day after its capture the flesh was so decomposed (though not offensive) that it resembled slime. Near the tail was a gash extending across the body, and part of the dorsal fin had been bitten away. Skin very thin and tender.

"This specimen was seen by some boys to run ashore on the beach; they immediately informed a zealous friend of the Museum, Mr. Adams of Pappendorp, who at once secured it, and laying it on a long plank had it brought to me; it was, however, dead when it reached me. Its colours soon faded out, and it is now nearly white. Mr. Adams says that in dying it exhibited iridescent hues.

"Comparing it mentally with fragments of another fish of the same genus which reached me from Simon's Bay, I should say it was a second species found on this coast; the former was not nearly so broad, and yet of equal length. I cannot identify it with either *G. ascanii*, *G. hawkenii*, or Russel's *Gymnetrus*, descriptions of which are in Shaw. It is probably *G. capensis*, Cuvier (Hist. des Poissons, vol. x. p. 376). That was described from an imperfect specimen; but Cuvier says it much resembles his *G. gladius*, a figure of which is given (No. 298). My fish does resemble it; but the caudal extremity is different, and so are the markings. I therefore offer the accompanying sketches and description to the Zoological Society. The hard bony plates of the head and the dorsal filaments of *G. gladius* are very like those of my fish.

"I am, Sir, yours &c.,
"E. L. Layard."

The following papers were read:—

1. Descriptions of New or little-known American Birds of the Families *Fringillidæ*, *Oxyrhamphidæ*, *Bucconidæ*, and *Strigidæ*. By P. L. Sclater, M.A., Ph.D., F.R.S., and Osbert Salvin, M.A., F.L.S., &c.

(Plate XXIX.)

1. Peucæa notosticta, sp. nov.

Supra fuscescenti-cinerea, interscapulio et alarum tectricibus distincte nigro striatis: pileo medio cinereo, utrinque rufescenti-brunneo nigro striato: superciliis et oculorum ambitu albis: alis et cauda nigricanti-cinereis, plumarum marginibus dilutioribus, secundariis extus brunnescente limbatis: subtus alba, cinereo, præcipue in pectore et lateribus, lavata; ventre medio et crisso dilute cinnamomeis: striga mentali utrinque nigricante: rostro nigro: pedibus flavicantibus: long. tota 6·5, *alæ* 2·7, *caudæ* 3, *tarsi* 0·7 *poll. Angl.*

Hab. in Mexico meridionali (*Boucard*).

Obs. Similis *P. boucardi*, sed pilei lateribus rufescenti-brunneis nigro striatis, et interscapulio nigro distincte strigato diversa.

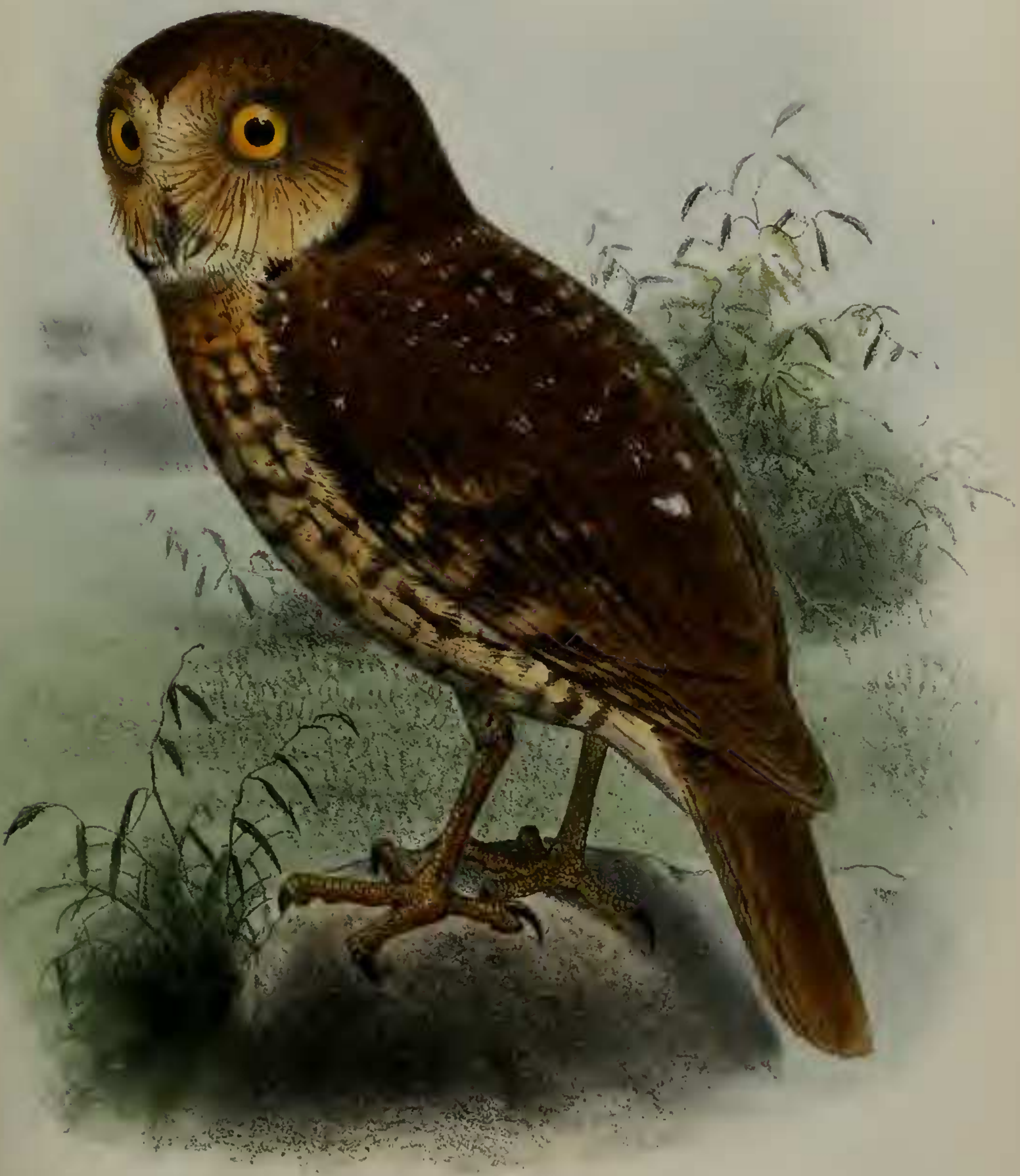
Mus. Salvino-Godmannico.

M. Boucard's recent collections from the States of Puebla and Mexico contained a single skin of the present species, which, although very closely allied to *P. boucardi*, is certainly distinct, and may be easily recognized by the characters pointed out above.

In the single specimen obtained the bill is black; but this may be a seasonal character. The wings are rather longer than in *P. boucardi*, the fourth primary being longest and slightly exceeding the third and fifth, which are equal. The first primary is 0″·4 shorter than the fourth.

We are acquainted with five species of *Peucæa*, which we divide

P.Z.S.1868.Pl.XXIX.



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M & N.Hanhart, imp

GYMNOGLAUX LAWRENCII

BRITISH MUSEUM
ZOOLOGY
NATURAL HISTORY

(following Baird) into two groups:—first, those without any rictal streak and with the bend of the wing yellowish; and, secondly, those with a rictal streak, and with the bend of the wing whitish.

a. *Sp. striga rictali nulla: campterio flavicante.*

(1) PEUCÆA ÆSTIVALIS.

Fringilla æstivalis, Licht.: *Fr. bachmanni,* Aud.: *Peucæa æstivalis,* Baird, B. N. A. p. 484.

Hab. North America, Georgia (*Baird*).

Mus. P. L. S. et Salvino-Godmannico.

(2) PEUCÆA BOTTERII.

Zonotrichia botterii, Sclater, P. Z. S. 1857, p. 214.

Peucæa botterii, Sclater, Cat. A. B. p. 116.

Hab. Mexico merid.: Orizaba (*Botteri*); Atlisco (*Boucard*).

Mus. P. L. S. et S.-G.

This species was originally described by Sclater from a single indifferent skin obtained by Botteri near Orizaba. The specimens *b*, *c*, and *d* of his American Catalogue, subsequently referred to it, have since been found to belong to *P. boucardi.* But Salvin has obtained from M. Boucard's recent collection a second (good) example of the bird. This shows that it is a species very closely allied to *P. æstivalis,* but differing in its larger size, paler chest, longer and stouter tarsi, and larger feet. In the colouring of the body above, the two species approximate very closely.

(3) PEUCÆA CASSINI.

Zonotrichia cassinii, Woodhouse.

P. cassinii, Baird, B. N. A. p. 485.

Hab. Texas, San Antonio (*Woodhouse* et *Dresser*); Sonora (*Kennerly*).

Mus. P. L. S.

b. *Sp. striga rictali nigra; campterio albicante.*

(4) PEUCÆA BOUCARDI.

Zonotrichia boucardi, Sclater, P. Z. S. 1867, p. 1, t. 1.

Hab. Mexico merid.: Orizaba (*Botteri*); Atlisco et La Puebla (*Boucard*).

Mus. P. L. S. et S.-G.

(5) PEUCÆA NOTOSTICTA, nobis.

We have not yet seen specimens of *P. ruficeps* (Baird, B. N. A. p. 486) from California, which seems to be a good species of the second section.

2. ZONOTRICHIA QUINQUESTRIATA, sp. nov.

Schistacea, interscapulio vinaceo tincto: alis caudaque fusco-

nigricantibus, secundariorum et tectricum majorum marginibus externis brunnescentibus: superciliis, striga rictali utrinque et gula media albis: gula superiore utrinque et inferiore tota cum pectore medio nigris, ventre medio, hypochondriis et crissi plumarum marginibus nigris: rostro nigricanti-corneo, mandibula flavo notata: pedibus corylinis: long. tota 6·5, *alæ* 2·8, *caudæ* 2·5, *tarsi* 0·7.

Hab. Mexico.

Mus. P. L. S.

We describe this well-marked species from a single indifferent skin, which has long remained without a name, in Sclater's collection. It was obtained by him some years ago from Mr. Gould, who received it along with a collection of Mexican Humming-birds.

The species differs in several respects from the members of the genus *Zonotrichia* as restricted by recent systematists, but we know not where else to place it. The wings are short and much rounded, the third, fourth, and fifth primaries being equal and longest, the second being only slightly shorter. The first primary is 0·35 shorter than the longest, and longer than is usual in typical *Zonotrichiæ*. The tail is short and slightly rounded, and bears no markings on the outer rectrices. We have named it *quinquestriata*, from the five white lines which originate from the bill. These are two short superciliary stripes, two rictal stripes, and one rather broader stripe in the centre of the black throat. In this respect our bird somewhat resembles *Z. mystacalis*, which, however, is readily distinguishable by the bright reddish-brown rump and longitudinal stripes on the head and interscapularies.

3. PYRGISOMA CABANISI.

Melozone biarcuata, Cab. J. f. O. 1860, p. 412.

Pyrgisoma kieneri, Cassin, Proc. Acad. Phil. 1865, p. 169; Lawrence, Ann. L. N. Y. viii. p. 481.

Supra fuscum, pileo et plumis auricularibus castaneis: fronte nigra, loris et regione oculari albis: subtus cinereum, medialiter album, striga utrinque rictali et plaga pectorali media nigris: subalaribus albis: rostro nigro, pedibus corylinis.

Hab. San José, Costa Rica (*Hoffmann*).

Mus. Parisiensi, Berolin. et P. L. S.

Obs. Simile *P. biarcuato*, sed regione parotica castanea et plaga pectorali nigra facile distinguendum.

It is unfortunate that all the naturalists who have met with specimens of the present bird should have identified it wrongly. Dr. Cabanis has referred it to the *Pyrgita biarcuata*, Prévost, a well-known Guatemalan species of the same genus, from which it is easily distinguishable, as above noted. Messrs. Cassin and Lawrence have supposed it to be *Pyrgisoma kieneri* of Bonaparte, overlooking the fact that the latter species is characterized as being, in comparison with *P. biarcuatum*, "*valde majus et rostro robustiore*," whereas the present bird is of exactly the same form as *P. biarcuatum*, and rather smaller in dimensions.

4. PYRGISOMA KIENERI.

Pyrgisoma kieneri, Bp. Consp. i. p. 486.

Fuscum, pileo et capitis lateribus rufis: plumis auricularibus dorso concoloribus, harum autem apicibus castaneis, loris albescentibus, fronte et genis fuscescenti-nigris: subtus album, hypochondriis dorso concoloribus, macula pectorali indistincta nigra; crisso rufescente; rostro nigricanti-corneo, pedibus pallide corylinis: long. tota 7·3, *alæ* 3·3, *caudæ* 2·9, *tarsi* 1.

Hab. Western Mexico (?).

Mus. Paris.

Obs. Similis *P. rubricato*, sed rostro magis crasso, pedibus robustioribus, et colore corporis superi brunnescentiore.

The insufficient diagnosis of *Pyrgisoma kieneri* given in the 'Conspectus' has principally caused the great confusion which now prevails among the species of this group, and which, having lately inspected the typical example of this species in the Paris Museum, we now hope to clear up. *Pyrgisoma kieneri* of Bonaparte is founded on a single skin in the Paris Museum, collected during the voyage of the 'Danaïde' in May 1843. The locality is not given; but the bird was in all probability obtained somewhere on the western coast of Mexico. In general plumage *P. kieneri* is more like *P. rubricatum* than any other species of the group; but it is at once distinguishable from all its congeners by its stouter bill, and larger and stronger tarsi and toes. It was, no doubt, these characters that induced Prince Bonaparte subsequently to remove it from *Pyrgisoma* and to associate it with the Brown Pipilos (*P. fuscus*, &c.) as a separate genus *Kieneria**. It is, in fact, rather difficult to decide whether to arrange *Pyrgisoma kieneri* with the other Pyrgisomas or with these Pipilos. But, upon the whole, we prefer to adopt the former course, as it would be unnatural to dissociate it from *P. rubricatum*, with which it so closely agrees in plumage. But *P. rubricatum* is certainly a typical species of *Pyrgisoma*, as is allowed by all writers upon the group.

The five species of *Pyrgisoma* known to us may be arranged as follows:—

Sect. a. *Species pileo castaneo, gutture albo.*

a′. *pectore immaculato.*

(1) PYRGISOMA BIARCUATUM.

Pyrgita biarcuata, Prév. Voy. Vénus, Ois. t. 6.

Pyrgisoma biarcuatum, Bp. Consp. p. 486; Scl. & Salv. Ibis, 1859, pp. 5, 18.

Hab. Guatemala (*Salvin*).

Mus. P. L. S. et S.-G.

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* Compt. Rend. xl. p. 356 (1855).

b′. *plaga pectorali nigra.*

(2) PYRGISOMA CABANISI, nobis.

Hab. Costa Rica.
Mus. Paris. et P. L. S.

(3) PYRGISOMA RUBRICATUM.

Tanagra rubricata, Licht. in Mus. Berol.
Atlapetes rubricatus, Cab. Mus. Hein. i. p. 140.
Melozone rubricata, Cab. J. f. O. 1860, p. 413, et 1866, p. 234.
Pyrgisoma xanthusi, Baird; Lawr. Ann. N. Y. Lyc. viii. p. 480.
Hab. Mexico: Plains of Colima (*Xanthus*); Atlisco (*Boucard*).
Mus. S.-G.

(4) PYRGISOMA KIENERI.

Pyrgisoma kieneri, Bp. Consp. i. p. 486.

Similis præcedenti, sed rostro magis crasso, pedibus robustioribus, et colore corporis superi brunnescentiore: regione parotica dorso concolori.
Hab. Western Mexico (?).
Mus. Paris.

Sect. b. *Pileo medio cinereo, lateraliter nigro: gutture toto nigro.*

(5) PYRGISOMA LEUCOTE.

Melozone leucotis, Cab. J. f. Orn. 1860, p. 413; Cassin, Pr. Ac. Phil. 1865, p. 169.
"*Chamæospiza torquata*," Scl. & Salv. Ibis, 1860, p. 274.
Pyrgisoma leucote, Salv. Ibis, 1866, p. 205.
Hab. Costa Rica (*Hoffmann, Carmiol*); Guatemala (*Salvin*).
Mus. P. L. S. et S.-G.

5. OXYRHAMPHUS FRATER, sp. nov.

Clare viridis; pileo nigro variegato, crista mediali coccinea: alis caudaque nigris extus viridi limbatis, secundariorum et tectricum marginibus externis et caudæ apice extremo pallide flavis: subtus pallide flavus, nigro squamatus, ventris medii et crissi maculis fere evanescentibus: rostro corneo, pedibus plumbeis: long. tota 6·5, *alæ* 3·5, *caudæ* 2·1, *rostri a rictu* 0·85, *tarsi* 0·8.
Hab. Veragua (*Arcé*).
Mus. S.-G.
Obs. Similis *O. flammicipiti* quoad colores, sed rostro longiore, alis brevioribus et cauda multo breviore distinguendus.

Arcé's last collection contains two skins of this northern representative of the Brazilian *Oxyrhamphus flammiceps*, from which it is easily distinguishable by its short tail. In coloration it scarcely differs, except in its generally brighter plumage, and rather broader cream-coloured edgings to the outer webs of the secondaries and wing-coverts.

It is rather surprising to meet with a second species of this peculiar form in Central America, when nothing is known of its occurrence elsewhere, except in the wood-region of Brazil. We have little doubt, however, that some species of the genus will eventually be found somewhere in the more northern part of South America.

Arcé's specimens of this species were obtained at Calovevora, in Veragua. The example described is marked "female;" but the sexes are probably alike. The second is a young bird of the same sex, in which the scarlet crest is only just commencing to show itself.

6. MONASA GRANDIOR, sp. nov.

Schistacea; capite undique, alis et cauda nigricantibus, æneo perfusis: fronte, loris et gula albis: rostro ruberrimo, pedibus nigris: long. tota, 12, *alæ* 5·7, *caudæ* 5·4.

Hab. Costa Rica, Angostura (*Carmiol*); Mosquitia (*Bell*).

Mus. S.-G.

Obs. Similis *M. morpheo* ex Brasilia, et crassitie majore et capite undique nigricantiore vix diversa.

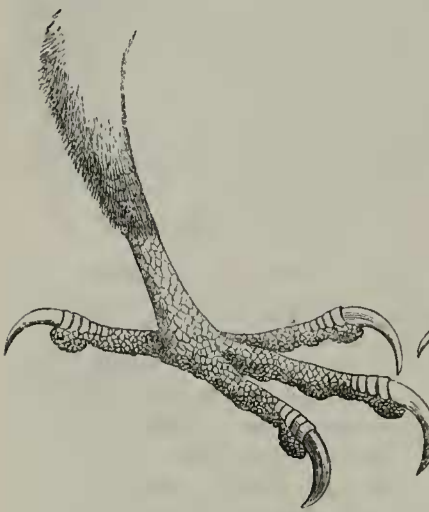
A Costa-Rican collection recently received from Mr. Carmiol contains a single skin of this *Monasa*, which, as above pointed out, is so like the Brazilian *M. morpheus* that we have had some difficulty in distinguishing it. As, however, the intermediate territory between the ranges of these two near allies is occupied by two other species (viz. *M. pallescens*, Cass., of New Granada, and *M. peruana*, Bp., of Upper Amazonia), both of which are recognized as distinct, we have deemed it advisable, in conformity with the laws of geographical distribution, to bestow a name upon the present bird, although its distinctive characters are not very pronounced. In some drawings of birds collected on the Mosquito coast by Mr. Bell, submitted some years ago to Sclater, was a figure which there can be little doubt (from Sclater's notes taken at the time) must have been intended to represent this species. We may therefore conclude that it extends its range northwards into Mosquitia.

A complete synonymy of the six known species of *Monasa* is given by Mr. Cassin in the 'Proceedings of the Academy of Sciences of Philadelphia' for 1860 (p. 135). The present bird makes the seventh of the genus. See also 'Museum Heineanum,' *Scansores* (p. 126 *et seq.*), where a good account of the group is given.

7. GYMNOGLAUX LAWRENCII. (Plate XXIX.)

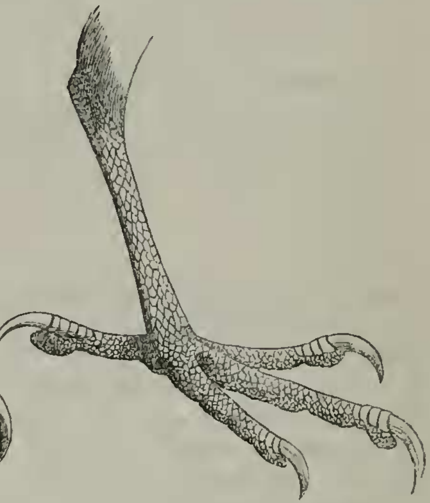
In an article on Cuban birds in the 'Annals of the Lyceum of New York' (vol. vii. p. 247), Mr. Lawrence has correctly pointed out the differences which subsist between the two known species of the Antillean genus *Gymnoglaux*, but has unfortunately committed an error in their nomenclature. Mr. Lawrence has referred the Cuban bird to the *Strix nudipes* of Daudin, and has proposed to call the species of the Virgin Islands *Gymnoglaux newtoni*. A recent inspection of the type specimens of *Strix nudipes* in the Paris Museum (those obtained by Maugé in Porto Rico), and a comparison of them with a skin from St. Thomas's, has convinced us that these birds are identical, and perfectly distinct from their Cuban representative. It becomes therefore necessary to bestow a new name upon the latter; and we have great pleasure in calling it *Gymnoglaux lawrencii,* after our friend Mr. Lawrence, who has so well pointed out its distinctive characters.

Fig. 1.



Foot of *G. nudipes.*

Fig. 2.



Foot of *G. lawrencii.*

The synonymy of the only two known species of the genus *Gymnoglaux* will therefore stand as follows:—

(1) Gymnoglaux nudipes.

Strix nudipes, Daud. Tr. d'Orn. ii. p. 199; Shaw, Gen. Zool. vii. p. 269; Vieill. Ois. de l'Am. Sept. i. p. 45, t. 16.

Gymnoglaux nudipes, A. & E. Newton, Ibis, 1859, p. 64, t. 1.

Syrnium nudipes, Kp. Trans. Z. S. iv. p. 250.

Gymnoglaux newtoni, Lawr. Ann. N. Y. Lyc. viii. p. 258.

Major: supra fusca nigro vermiculata: tarsis partim plumosis, dimidio inferiore nudo. (Cf. fig. 1.)

Hab. Porto Rico (*Maugé*); St. Thomas (*Riise* et *Swift*); S. Croix (*Newton*).

(2) Gymnoglaux lawrencii. (Plate XXIX.)

Noctua nudipes, Lembeye, Aves de Cuba, p. 23, t. 4. f. 2.

Gymnoglaux nudipes, Cab. J. f. O. 1855, p. 465; Lawr. Ann. Lyc. N. Y. vii. p. 257; Gundlach, Repert. F. N. i. p. 226.

Minor: supra fusca unicolor, maculis albis aspersa: tarsis fere omnino nudis. (Cf. fig. 2.)

Hab. Cuba (*Lembeye* et *Gundlach*).

Of this latter species we have examined two specimens in a series of American Strigidæ, kindly submitted to our inspection by the authorities of the Smithsonian Institution. One of these was collected by Mr. Nathaniel H. Bishop at Remedios, in Cuba, in October 1863; the other by Mr. Charles Wright at Monte Verde, in the same island, in August 1861. There is likewise a single example of this bird in the Paris Museum.

2. On the Incubation of the Apteryx.

By A. D. Bartlett, Superintendent of the Society's Gardens.

In the second volume of Mr. Gould's book upon the Birds of Australia, at page 570, will be found several statements made with reference to the mode of reproduction of the Apteryx. As these strange stories are most of them derived from the natives of New Zealand, and do not appear to have been verified by any one upon whom we can place much reliance, it may be as well to record a few facts that have occurred under my own observation in the Society's Gardens.

In 1851 Lieut.-Governor Eyre presented to the Society an Apteryx. This bird proved to be a female of *Apteryx mantelli*. In the year 1859 she laid her first egg, and has continued to lay one or two eggs every year since that time. In 1865 a male bird was presented by Henry Slade, Esq. During the last year these birds showed symptoms of a desire to pair. This was known by the loud calling of the male, which was answered by the female in a much lower and shorter note. They were particularly noisy during the night, but altogether silent in the daytime. On the 2nd of January the first egg was laid, and for a day or more the female remained on the egg; but as soon as she quitted the nest the male bird took to it, and remained constantly sitting. On the 7th of February the second egg was laid, the female leaving the nest as soon as the egg was deposited. The two birds now occupied the two opposite corners of the room in which they were kept, the male on the two eggs in the nest under the straw, the female concealed in her corner, also under a bundle of straw placed against the wall. During the time of incubation they ceased to call at night, in fact were perfectly silent, and kept apart. I found the eggs in a hollow formed on the ground in the earth and straw, and placed lengthwise side by side. The male bird lay across them, his narrow body appearing not sufficiently broad to cover them in any other way; the ends of the eggs could be seen projecting from the side of the bird. The male continued to sit in the most persevering manner until the 25th of April, at which time he was much exhausted, and left the nest. On examining the eggs I found no traces of young birds.

Notwithstanding the failure of reproducing the Apteryx, I think sufficient has been witnessed to show that this bird's mode of reproduction does not differ essentially from that of the allied Struthious birds, in all cases of which that have come under my observation the male bird only sits. I have witnessed the breeding of the Mooruk, the Cassowary, the Emu, and the Rhea; and the mode of proceeding of the Apteryx fully justifies me in believing the habits of this bird to be in no way materially different from those of its allies.

3. On the Mammalian Fauna of Greenland.

By ROBERT BROWN, F.R.G.S. &c. &c.

[Communicated by Dr. James Murie.]

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5. Doubtful and Mythical Species, p. 357.

1. *History of the Subject.*

In entering upon a review of the Greenlandic species of Mammalia, it may be a matter of surprise to some that anything remains to be said concerning the larger animals of a country so comparatively near home, and regarding which so much has been written, where Egede, Fabricius, Vahl, and Rink lived, and regarding which we possess the remarks of such excellent naturalists as the acute authors of the 'Fauna Grœnlandica' and 'Grönland Geographisk og Statistisk.' Between the dates of the publication of these two works an interval of upwards of seventy years extends, so that one might suppose that any errors of the first work might have been fully discovered in the interval and corrected in the second. All surprise vanishes, however, when we find that the contrary holds true, and that to-day we know almost as little about the Mammals of Greenland as we did when Fabricius gave us the first systematic account of them. The fact of the matter is that naturalists who have visited Greenland have been too much interested in other departments of natural history to pay attention to the larger members of the fauna, or have supposed that there was nothing worth adding to or (what is just as important) subtracting from it. Accordingly, we find all authors on Arctic animals merely contenting themselves with giving a list of Fabricius's species, and at the same time perpetuating the errors which he fell into through ignorance or credulity, independently of the fact that he only wrote of that limited portion of the country then inhabited by the natives over which his authority as a "Grönlandske Missionair" extended. Can we therefore be astonished if we find the fauna of Greenland, in the class Mammalia, burdened with species which have no existence save in the vivid imagination of the Eskimo or the overlearned acuteness of zoologists, and bereft of others which ought to take their place—their history poisoned with fables only worthy of the belief of the last century, and their geographical range in the country over which they are distributed scarcely touched on, or wrongly described. The accounts of the older writers on Greenland (Egede-Saabye, Cranz, &c.) were very unsatisfactory; but a new era in the history of northern zoology dawned when Otto Fabricius, who had passed several years in Greenland as a Missionary, published his 'Fauna Grœnlandica'*. This work, far in advance of its age, and which for the conciseness and accuracy of its descriptions has rarely been surpassed, has most deservedly retained its place as our standard authority on the zoology of Danish Greenland*. Herein are enumerated thirty-one species of Mammalia indigenous to the country, exclusive of Man and those which have been introduced by man's agency. Four of these species I have shown in this memoir to have been entered upon imperfect grounds, one was mistaken for another (*Ovibos moschatus* for *Bos grunniens*), and several are now known to be only synonyms of other species. The species of Cetacea are, as might be expected, the most obscurely described of all, and have occasioned much controversy; and more superabundance of literary acumen has been spent on these descriptions than the nature of them will allow of.

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* Hafniæ et Lipsiæ, 1780.

Subsequently the elder Reinhardt gave some notes on the Greenland Mammalia in the 'Isis' for 1848, which, in the main, are only a reproduction of the earlier account of Fabricius; and in 1857, the present Professor Reinhardt, of Copenhagen, in the Appendix to Rink's 'Grönland'† furnished a list of the species, also following Fabricius. He has, however, entered the only species then added to the list, viz. *Mus grönlandicus* of Traill‡, discovered by Scoresby on the east coast in 1822, under the name of *Hypudæus grönlandicus*§, and attempts to make out what was the *amarok* of the older authors, Fabricius's *Gulo luscus*, the *Phoca ursina*, which Fabricius enters as a member of the Greenland fauna, the *Trichechus manatus*, &c., and with some success, though, not having visited Greenland himself, he is not so successful as he otherwise might have been. This list, as all the others, solely relates to Danish Greenland, extending from Cape Farewell (lat. 59° 49′ N., long. 43° 54′ W.) to Upernavik (lat. 72° 48′ N., long. 55° 54′ W.), and is valuable as expressing the state of knowledge regarding the Mammalia of Greenland in Denmark, represented by a naturalist who has paid much attention to the Arctic fauna, in the elucidation of some of the marine Mammalia of which he has so highly distinguished himself. This, as far as I am aware, is all that immediately relates to the arctic Mammals in Greenland. Various other writings have thrown much light on their *general* history; but it is with their *special* history and geographical distribution in Greenland that I have to deal. Among these memoirs, I ought not to omit mentioning the excellent paper on the Mammalia of the northern countries by Professor Malmgren‖, who accompanied the Swedish Expedition of Otto Torell to Spitzbergen*. He has added, incidentally, not a little to our knowledge; but his treatise is mostly a compilation, and, not looking upon the arctic fauna in a comprehensive view, he has fallen into many errors in zoogeography. For instance, I cannot understand why he has excluded *Balanoptera gigas*, Eschr., and *B. rostrata*, Fab., from the Spitzbergen fauna, nor still less why *Balæna mysticetus*, Linn., is not classed among the Mammals of the seas around. This last is assuredly found there. In Smeerenberg Bay the Dutch used to catch it in abundance, and even erected boiling-houses on shore to "try" out its oil; and the two former are also found there. Indeed nearly all of the Greenland marine Mammalia are also found in Spitzbergen; and certainly Dr. Malmgren's stay was much too short to allow him to come to any decision on the matter.

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* In 1867, whilst staying at Claushavn, I occupied as my *study* a little room in the old Pastor's house, now deserted and used to accommodate any stray wayfaring men like myself. This was said to be the "dark closet" where Fabricius wrought at his Fauna, Lexicon, and other works: it was afterwards the residence of Saabye the grandson of Egede, who also wrote on Greenland.

† Grönland Geographisk og Statistisk beskrevet &c. Band ii. Tillaeg Nr. i. (Pattedyr). This appendix was also published separately, 'Naturhistoriske Bidrag til en Beskrivelse af Grönland,' pp. 1–12.

‡ Scoresby, 'Journal of a Voyage to the Northern Whale fishery, &c.,' Appendix.

§ Prof. Reinhardt obligingly informs me (March 1868) that he is now quite convinced that this is a *Myodes*, though he only knows it from description.

‖ "Beobachtungen und Anzeichnungen über die Säugethierfauna Finmarkens und Spitzbergens," in Wiegmann's Archiv für Naturgeschichte, (Berlin,) 1864, pp. 63–97, translated from Öfversigt af Kong. Svensk. Akad. &c. (1863) ii. pp. 127–155.

Eschricht and J. T. Reinhardt's memoirs on the Greenland Whale† have added directly to our knowledge; while the numerous papers and catalogues of Gray‡ and Lilljeborg§ on the British and Scandinavian Cetacea (most of which are also found in Greenland) have helped us to a right understanding of that order. Nilsson has disentangled the northern Pinnipedia in his History of Scandinavian Mammals‖; and so has Gray¶ and, more closely relating to Greenland, Fabricius**, in a supplementary paper to his Fauna, and Dr. Wallace in the short abstract of one read before the Royal Physical Society of Edinburgh††, on those killed by the northern Seal-hunters. But nearly all of these papers are only local, or relate merely to questions of specific distinctions and synonyms, and touch but lightly upon the Seals either as animals of Greenland, or on their migrations from one part of the Arctic regions to another. Our own Arctic Expeditions halting little, if at all, on the Greenland coast, and many of them being unprovided with competent naturalists, have added almost nothing to our knowledge of the Arctic or Greenland Mammals; but the American Expeditions to Smith's Sound, under Drs. Kane‡‡ and Hayes§§, have supplied us with many interesting notes on the range and habits of species. I wish I could say the same for all the describers of their collections. Professor

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* Svenska Expeditionen till Spetsbergen år 1861, under ledning af Otto Torell—ur detagarnes Anteckningar och andra handlingar skildrad af K. Cheydenius (Stockholm, 1865). *Vide* the account of the Walrus in that work, pp. 168–183 (with plate and woodcut), the excellent figures of Näbbhvalar (*Hyperoodon butzkopf*, Lacép.) facing p. 480, &c.

† Ray Society's Memoirs on the Cetacea, 1866.

‡ Catalogue of Seals and Whales in the British Museum, 1866; and Proceedings of the Zoological Society, and Annals of Nat. Hist., *passim*.

§ Ray Soc. Mem. Cet.

‖ Skandinavisk Fauna, Första Delen, Däggadjuren, pp. 268–326 (1847), also translated in Wiegmann's Archiv für Naturgeschichte, Bd. vii. &c.

¶ *Lib. et locc. citt.*

** Naturhistoriske Selskabets Skrivter, Bd. i.

†† Proceedings of the Royal Physical Society of Edinb. 1862–63.

‡‡ Arctic Explorations, 2 vols. 1855.

§§ Voyage towards the open Polar Sea (made in 1860), 1867.

Cope* has attempted to establish several new (*sic*) species of *Beluga* from Hayes's collection; but none of them (in my opinion) have the slightest claims to specific distinction†, the supposed differences being merely such as age or the ordinary variations between one individual and another would produce. By such well-meaning efforts, misdirected, science loses rather than gains.

Other contributions to Arctic Mammalogy I shall have occasion to notice as I proceed.

2. *Systematic Distribution of the Greenland Mammalian Fauna.*

As might be expected, the character of the Greenland Mammalian fauna partakes of a sarcophagous type, the phytophagous species proper being only three, and the marine species far exceeding in number the terrestrial species. In the nomenclature of the Mammalia, though only a secondary matter, in a paper of this nature, so long as they are correctly named, I have followed some standard author, without inquiring too strictly into the soundness or priority of the specific names applied, or the value of the tribal or generic divisions under which these authors have classed them.

This subject I may return to more critically at another time; but in a paper of this nature, I have allowed convenience of reference to overrule other considerations, considering that the eminence of the zoologists followed will be a sufficient safeguard that no great error has been committed. Accordingly the nomenclature of Baird's 'General Report on the Mammalia of North America' is chiefly followed, as far as relates to the Greenland terrestrial species, and Dr. Gray's British-Museum Catalogue (1866) for the marine species, with only a few trifling exceptions, having a view to certain points of the synonymy of Fabricius's species of Cetacea, to be afterwards discussed. I have, however, ventured to differ with Dr. Gray as to the relative rank of the group of Seals, believing, with Illiger‡, that they are entitled to ordinal rank, and have accordingly designated them *Pinnipedia* (Illig.)—forming Gray's tribes *Phocina, Trichechina,* and *Cystophorina,* for the sake of uniformity, into families under the titles of *Phocidæ, Trichechidæ,* and *Cystophoridæ,* comprising the same species as the former tribes, without, however, committing myself to an opinion regarding the advisability of so many generic and other subdivisions of so natural a group, or of the good taste displayed by M. Frédéric Cuvier in the formation of some of his genera. Thus, with Professor Nilsson§, I cannot see why, in the formation of the genus *Callocéphale*‖ (*Callocephalus*), Linné's *Phoca vitulina* should have been chosen as the type of the genus, while

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* Proceedings of the Philadelphia Academy of Sciences.

† Prof. Reinhardt, who, as Inspector of the Zoological Museum of Copenhagen, has every means of arriving at a determination from an examination of a large number of skulls, writes to me that he has arrived at the same opinion.

‡ Prodomus, p. 138 (1811).

§ Skand. Faun. i. p. 275.

‖ F. Cuvier, Mémoires du Muséum, xi. p. 182.

Phoca barbata, Fab., should have been retained as the type of the genus *Phoca**.

Dr. Gray's nomenclature and classification of the Cetacea I have followed almost literally, though some of his species, such as *Lagenorhynchus albirostris*, *L. leucopleurus*, *Delphinus euphrosyne* (*D. holböllii*, Eschr.), and *Hyperoodon* (*Lagenocetus*) *latifrons*, are only known from skulls or skeletons. The localities are also very vaguely known; so that in the absence of all details in reference to their habits and distribution, and from the fact, moreover, of their specific (and still more their generic) claims not being in every case universally conceded, the physical geographer or naturalist (strictly speaking) can have little to say regarding them. I have, however, entered them as members of the Greenland fauna, in deference to the opinion of their founder, who, since the death of the lamented Eschricht stands alone in his knowledge of the systematic history of the marine Mammalia. The following table will show the general arrangement, the tribal and numerical distribution of the Mammalia of Greenland, exclusive of all introduced species and others which have been erroneously included in former lists, and of the first with whom Fabricius heads his fauna, "*Homo sapiens, sine deo, sine domino*:"—

MAMMALIA GRŒNLANDICA.

Order CARNIVORA.

    Family Ursidæ.

        Genus Ursus (Thalarctos).

            U. maritimus, Linn.

    Family Canidæ.

        Genus Vulpes.

            V. lagopus (Linn.), Rich.

        Genus Canis.

            C. familiaris, Linn., var. *borealis*.

Order RODENTIA.

    Family Arvicolinæ.

        Genus Myodes.

            M. torquatus (Pall.), Keys. & Blas.

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* Even Nilsson's genus *Cystophora*, though faultless in aptitude, is liable to the objection that it has also been applied to a genus of Algæ by J. Agardh. This awkward confusion, however, is so common that it is only just to criticise the fault in the abstract.

Family Leporidæ.
  Genus Lepus.
    L. glacialis, Leach.

Order Ruminantia.
  Family Bovidæ.
    Genus Ovibos.
      O. moschatus (Gm.), Blainv.
  Family Cervidæ.
    Genus Rangifer.
      R. tarandus (L.), Baird.

Order Pinnipedia.
  Family Phocidæ.
    Genus Callocephalus.
      C. vitulinus (L.), F. Cuv.
    Genus Pagomys.
      P. fœtidus (Müll.), Gray.
    Genus Pagophilus.
      P. grœnlandicus (Müll.), Gray.
    Genus Phoca.
      P. barbata, O. Fab.
  Family Trichechidæ.
    Genus Trichechus.
      T. rosmarus, Linn.
    Genus Halichœrus.
      H. grypus (O. Fab.), Nilss.
  Family Cystophoridæ.
    Genus Cystophora.
      C. cristata (Erxl.), Nilss.

Order Cetacea.
  Family Balænidæ.
    Genus Balæna.
      B. mysticetus, Linn.

Family Balænopteridæ.
Genus Physalus.
P. antiquorum, Gray.
Genus Balænoptera.
B. gigas, Eschr.*
B. rostrata (Müll.), Gray.
Genus Megaptera.
M. longimana, Gray.
Family Catodontidæ.
Genus Catodon.
C. macrocephalus (Linn.), Lacép.
Family Delphinidæ.
Genus Delphinus.
D. euphrosyne, Gray.
Genus Lagenorhynchus.
L. albirostris, Gray.
L. leucopleurus (Rasch), Gray.
Genus Orca.
O. gladiator (Bonn.), Sund.
Genus Phocæna.
P. communis, Brookes.
Genus Beluga.
B. catodon (Linn.), Gray.
Genus Monodon.
M. monoceros, Linn.
Genus Globiocephalus.
G. svineval (Lacép.), Gray †.
Family Ziphiidæ.
Genus Hyperoodon.
H. butzkopf (Bonn.), Lacép.
H. latifrons, Gray.

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* *Sibbaldius borealis* (Less.), Gray, Proc. Zool. Soc. 1864, p. 223.

† *Delphinus tursio*, O. Fab. (*Tursio truncatus*, Gray); Grœnl. *Nesernak*.

3. *Geographical Distribution of Greenlandic Mammalia.*

Similarity of physical contour and a general uniformity of climate, varying, no doubt, in degree, but still sufficiently inhospitable throughout, with an abundance of the food on which all of them subsist throughout the habitable tracks and in the sea washing the shores of Greenland, have failed, contrary to what might have been expected, to produce a geographical distribution of the Mammalia in a like universal manner, or at all corresponding to the physical uniformity hinted at. It is only in the sea and on a narrow strip of land skirting the shores of Greenland that animal life has yet been found. The whole interior of the country appears to be merely a frozen waste, overlain to a depth of many feet by a huge *mer de glace*, extending, so far as yet known, over its entire extent (with the exception of the strip named) from north to south—a sea of freshwater ice whereon no creature lives, a death-like desert with nought to relieve the eye, its silence enlivened by the sound or sight of no breathing thing. This is the *Inlands Iis* of the Danish colonists; the outer strip, with its mossy valleys and ice-plained hills, is the well-remembered *Fastland*. Dreary, doubtless, it is to eyes only schooled in the scenery of more southern lands; but, with its covies of Ptarmigans flying up at your feet, with their *whir*!, the arctic fox barking its *huc*, *huc*, on the rocks, and the Reindeer browsing in the glens covered with the creeping birch (*Betula nana*, L.), the arctic willows (*Salix herbacea*, L., *S. arctica*, Pall., *S. glauca*, L., &c.), the crow-berry (*Empetrum*), the Vacciniums, and the yellow poppies (*Papaver nudicaule*, L.), it is a place of life, compared with the cheerless waste lying beyond. It is with it, therefore, and the sea circling around, that we have to deal.

Many of the animals comprising the mammalian fauna, influenced by no apparent physical cause, have but a limited geographical distribution, not extending south of a certain latitude, or north of another, while other species have a range over the shores of the frozen sea skirting three quarters of the world. Some species of Seals are migratory, while others are not; and the same is true of various species of Cetacea. All of the terrestrial species proper are indigenous all the year round, confined to the country by its insularity. I have drawn up a Table (pp. 340 & 341) expressing at a glance the degree and nature of their geographical distribution, local and general. In this Table I have divided the distribution under three main heads:—(1) general distribution over the range of the species, (2) nature of its distribution in Greenland, and (3) its local distribution in Greenland. I have, for the sake of convenience, divided the general range of Greenland species into six subdivisions, viz.:—(α) Circumpolar, comprehending the regions around the most northern limits yet reached by man, the particular locality within that region for each species being limited by the nature of its habitat; thus the Bear occupies the shores or frequents the ice-fields and the sea, the Seals the sea and the shore, or the ice-fields, the dog the vicinity of man's dwellings, and the Hare the land generally, while the Fox keeps more by the shore, but not in the sea, and rarely ventures out on the ice-fields; (β) Circumarctic America and (γ) Circumarctic Europe comprehend all the region about Greenland and south of the head of Baffin's Bay, down Davis's Strait, and other places south of the former limits, Hudson's Bay, Labrador, &c., on the one hand, and on the other the Icelandic seas and shores, the regions of Europe generally within or about the Arctic Circle. It may be called also subpolar, and has been formed to take in the distribution of some species of Seals and Cetacea. The two regions are about the same in zoogeography.

(δ) Circumarctic Asia comprehends similar limits on the Asiatic continent, and is made to take in the range of the Fox, Lemming, and a few other animals, which extend their range so far east and west. I have not thought fit to create in this table an *Arctic* division proper, limiting it by the arbitrary divisions of geography, divisions which, though necessary enough for the astronomical description of the earth, yet serve no purpose to the physical geographer in tracing the distribution of plants and animals over it. This division is comprehended under my *circumpolar* range, which ends on the seas adjoining Greenland about the head of Baffin's Bay. I have given its general limits there, as many species do not go beyond that barrier, and others do not come south of it. I am well aware that this may appear a somewhat loose way of expressing the limits of regions; but at the same time the species the range of which these divisions are made to express are most wonderfully careless of the degrees, minutes, and seconds which the geographer may erect as their limits, and we can therefore only express their divisional boundaries in an equally elastic manner. I trust, however, that they are sufficiently intelligible.

(ε) To give the southern range of certain species of Seals and Cetacea, I have erected a division for *temperate Europe*, comprehending the British and Scandinavian seas; and in the range of the same latitudes on the shores of the British provinces and the United States of America a (ζ) *temperate American division*. I have not, as in the circumarctic range, erected a division for temperate Asia, as I do not think there is a single species of Seal or Cetacea, found in the seas (and certainly no Mammals on the land) of temperate Asia, found in the corresponding seas of Europe and America, though, as several of the species are common to the circumarctic and circumpolar divisions of all three, some may yet be found. In preparing this table I have endeavoured to give the *natural* range of the species, and have not entered a species in any division because it has been, as an evident *straggler*, seen within that division. For instance, *Balæna mysticetus*, *Beluga catodon*, *Monodon monoceros*, and *Trichechus rosmarus* have all of them more than once found their way to the British seas, yet no zoogeographer would ever think of representing the Right Whale, the White Whale, the Narwhal, or the Walrus as regular members of the British fauna. On the other hand, I need scarcely say that when I put an animal into any division I do not thereby say that it is limited to that division (for, as shown on the table, many extend through several of these divisions), nor that they are found over all that division or series of divisions or regions. I have already explained that the range of each is limited according to its habitat and habits.

I have made these explanations because, as all rules are liable to exceptions, so are systems and systematic divisions. Nature abhors being confined between parallel lines.

Under the division of "Nature of its Distribution in Greenland" I have divided them into (α) Introduced species, (β) Migratory species, and (γ) Species indigenous all the year round.

(α) In Fabricius's day the following Mammals had been introduced into the country, but chiefly into South Greenland:—*Canis familiaris* (European breeds), *Felis domestica, Ovis aries, Capra hircus, Bos taurus, Sus scrofa, Mus decumanus*, and *Mus musculus*. All of these species are yet at times living in the country, but none of them can be said to be acclimatized. The Horse (*Nersasoak*) was once introduced into Greenland, but only remained for a short time. As far as I can discover, its importation was for the purpose of Major Oscean and Capt. Landorff, who in 1728 proposed the mad-cap scheme of "riding across Greenland!"

(β) As the winter approaches, most of the birds leave the country, and do not return again until spring. The terrestrial Mammals are prohibited, by the insularity of the country, from resorting to this method of escaping the rigours of the climate, or the scarcity of food. The Bear to some extent hybernates, though, as I shall afterwards show, this hybernation is not so complete as is usually supposed. The migratory Mammals are therefore limited to the marine species.

All of the Seals, with the exception of *Trichechus rosmarus, Callocephalus vitulinus*, and *Pagomys fœtidus*, leave the coast during a portion of the winter, and even of the summer: the migration of the Seals is too complicated a subject to be discussed in a general review; under my notes on each species I shall have occasion to recur to it. In like manner all the Cetacea leave the seas in the winter, with the exception of *Monodon monoceros* and *Beluga catodon*, which can be seen at open places in the ice all the winter through. Why these species should be winter denizens in preference to the others it is difficult to decide. Several species have what may be called a *local migration*, moving from one portion of the coast to another, north and south, during the summer, according to the state of the ice, &c.,—all of which will be noticed in another place.

(γ) The species indigenous all the year round are therefore the terrestrial Mammals and the remainder of the marine species not already mentioned as migratory, viz. *Ursus maritimus, Canis familiaris*, var. *borealis, Vulpes lagopus, Lepus glacialis, Myodes torquatus*, (?) *Ovibos moschatus, Rangifer tarandus, Trichechus rosmarus, Callocephalus vitulinus, Pagomys fœtidus, Monodon monoceros*, and *Beluga catodon*.

Name of Species.	General distribution.						Nature of distribution in Greenland.		
	Circumpolar.	Circumarctic America.	Circumarctic Europe.	Circumarctic Asia.	Temperate Europe.	Temperate America.	Introduced.	Migratory.	Indigenous all the year round.
Ursus maritimus	*	*	*	*	...	...	...	...	*
Vulpes lagopus	*	*	*	*	...	...	...	...	*
Canis familiaris, var. borealis	*	*	...	*	...	...	...	...	*
[Felis domestica]	...	...	...	...	...	...	*	...	...
Myodes torquatus	...	*	...	*	...	...	...	...	...
[Mus decumanus]	...	...	...	...	...	...	*	...	...
[—— musculus]	...	...	...	...	...	...	*	...	...
Lepus glacialis	*	*	*	*	...	...	...	...	*
[Sus scrofa]	...	...	...	...	...	...	*	...	...
Ovibos moschatus	*	*	...	...	...	...	...	...	*
Rangifer tarandus	*	*	*	*	...	...	...	...	*
[Ovis aries]	...	...	...	...	...	...	*	...	...
[Bos taurus]	...	...	...	...	...	...	*	...	...
[Capra hircus]	...	...	...	...	...	...	*	...	...
Callocephalus vitulinus	...	*	*	...	*	*	...	...	*
Pagomys fœtidus	*	*	*	...	*	*	...	...	*
Pagophilus grœnlandicus	*	*	*	...	*	*	...	*	...
Phoca barbata	*	*	*	...	*	*	...	*	...
Trichechus rosmarus	*	*	*	*	...	...	...	*	*
Halichœrus grypus	...	*	*	...	*	...	...	*	...
Cystophora cristata	*	*	*	...	*	*	...	*	...
Balæna mysticetus	?	*	*	...	...	...	...	*	...
Physalus antiquorum	...	*	*	...	*	*	...	*	...
Balænoptera gigas	...	*	*	...	*	*	...	*	...
—— rostrata	...	*	*	...	*	*	...	*	...
Megaptera longimana	...	*	*	...	*	*	...	*	...
Catodon microcephalus	...	*	*	...	*	*	...	*	...
Delphinus euphrosyne	...	...	...	...	...	...	...	*	...
Lagenorhynchus albirostris	...	...	...	...	...	...	...	*	...
—— leucopleurus	...	...	...	...	...	...	...	*	...
Orca gladiator	...	*	*	...	*	*	...	*	...
Phocæna communis	...	*	*	?	*	*	...	*	...
Beluga catodon	*	*	*	*	..	*	...	...	*
Monodon monoceros	*	*	*	*	...	...	...	...	*
Globiocephalus svineval	...	*	*	...	*	...	...	*	...
Hyperoodon butzkopf	...	*	*	...	*	*	...	*	...
—— latifrons	...	...	...	...	...	...	...	*	...
Numerical summary of distribution	13	26	23	9	15	14	7	19	11

NOTE.—This Table is manifestly imperfect, and the limits of species

Local distribution in Greenland according to latitude and coast.											
From Cape Farewell to northern limits.	From Cape Farewell to opening of Smith's Sound.	From Cape Farewell to Melville Bay.	From 67° N. lat. to northerly limits.	From 63° N. lat. to opening of Smith's Sound.	Cape Farewell to 72° N. lat.	Cape Farewell to 69° N. lat.	Cape Farewell to 67° N. lat.	Not north of 61° N. lat.	Not south of 76° N. lat.	Found on the east coast only.	Remarks.
*											
*											
*											
...	...	*	...	...	...	...	...	...	...	...	Properly speaking, only to most northerly outpost of Upernavik.
...	...	...	...	...	...	...	...	...	...	*	Doubtful if indigenous all the year round, or if at all.
...	...	*	...	...	...	...	...	...	...	...	Limits of Danish Greenland?
...	...	*	...	...	...	...	...	...	...	...	Do. do.
*											
...	...	...	...	...	...	...	*				
...	...	...	...	...	...	...	...	...	*	...	Not south of Wolstenholme Sound.
*											
...	...	...	...	...	...	...	...	*			
...	...	...	...	...	...	...	...	*			
...	...	...	...	...	...	...	*	...	...	...	Not north of Holsteensborg.
*											
*											
*	...	...	...	...	...	...	...	...	...	...	Possibly not north of Melville Bay.
*											
...	...	...	*								
...	...	...	...	...	...	*	...	...	...	...	Range rather doubtful.
*	...	...	...	...	...	...	...	...	...	...	Rare north of 70°.
...	*	...	...	...	...	...	...	...	...	...	Very rarely seen N. of 73° and S. of 65°.
...	...	*									
...	...	*									
...	...	*									
...	...	*									
...	...	...	...	...	*	...	...	...	...	...	Range doubtful.
...	...	...	...	...	...	...	...	...	...	...	Range unknown.
...	...	...	...	...	...	...	...	...	...	...	
...	...	...	...	...	...	...	...	...	...	...	
...	...	*	...	...	...	...	...	...	...	...	Those species of Cetacea marked as extending north only to Melville Bay, probably occasionally reach a higher latitude; but this bay is the usual limit, and north of this the species is rarely seen.
...	...	...	...	...	...	*	...	...	...	...	
...	...	...	...	*	...	...	...	...	...	...	
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...	...	...	...	...	...	...	*	...	...	...	
...	...	...	...	...	...	...	...	...	...	...	Range unknown, but probably the same as *H. butzkopf.*
10	1	9	2	1	1	2	3	2	1	1	

given are only, in most cases, approximate or provisional.

In addition to these well-established species there are others frequently entered among the Greenland Mammalia, some of which have but scant right to a place, and others are entirely mythical, as I will show in a section on these animals. Among these I class *Gulo borealis* (*Ursus luscus*), *Phoca ursina* (*Callorhinus ursinus*), and *Trichechus manatus* (*Rhytina gigas*) as animals with little or no claim to be admitted members of the Arctic fauna.

The columns for the "local distribution in Greenland" are arranged solely with reference to our present knowledge of the range of the species in the country, and, being only temporary and to a great extent artificial, are subject to changes as our knowledge of the species extends. At the same time I think it only right to say that they have been very carefully compiled, after considerable study of the *natural range* of the species, and upon principles akin to those for the general distribution of the species.

The column headed "East coast only" I have erected for the reception of *Myodes torquatus* solely, all the species of the east coast, so far as we know, being, with this exception, also common to the west. The east coast has, however, been very little explored, and no doubt something remains to be added to our knowledge of the range of species on that coast.

On a comparison of the Greenland fauna with that of other portions of the Arctic regions, we can see no reason for looking upon it, in common with the flora and the avi- and icthyo-faunas, as other than essentially Arctic-European, all of the species of Mammalia, with the exception of *Ovibos moschatos*, being found in either Spitzbergen or Nova Zembla, while many of the Arctic-American species are not found in Greenland. The only true American Mammal found in Greenland is the Musk-Ox, which might have crossed from the western shores of Smith's Sound (where Eskimo tradition describes it as once abundant) on the ice to the eastern shore, where alone in Greenland it seems to be now found, the great glaciers and ice-floes about Melville Bay seeming to act as a barrier to the southern and northern migrations of the animals on either side of them, and of Man equally with the lower animals.

Looking at the fauna of Spitzbergen *, if we take exception to the very dubious omission which Malmgren has made, we find that there is only one species of mammal found in these islands not found in Greenland; and this exception is *Mustela erminea*, which the author named even marks as doubtful (?); and the same is true of the mammals of Nova Zembla, if we take Von Baer's list † as representing the present state of our knowledge, though published more than thirty years ago. In this the exception is also a doubtful one ("a little white animal, species uncertain"), but probably an Ermine. I therefore think that we are justified in looking upon the mammalian fauna of Greenland as Arctic-European, and not Arctic-American, though I am aware that opposite views are entertained by naturalists of high eminence.

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* Malmgren, *loc. cit.*; Scoresby, 'Arctic Regions;' Phipps's 'Voyage;' Parry's 'Attempt;' Laing's 'Voyage to Spitzbergen,' &c. &c.

† K. E. von Baer, Wiegmann's Archiv für Naturgeschichte (1839), pt. vii. (*vide* Murray, 'Geogr. Distrib. Mamm.').

The mammalian fauna of Iceland has no connexion with that of either Greenland or Europe, that island not possessing a single species of mammal indigenous to it; all have been introduced by man, or, like the *Ursus maritimus* and *Vulpes lagopus*, have drifted from Greenland on ice-floes.

My friend Mr. Andrew Murray * seems to take exception to a Mouse which is said to be found in Iceland, and regarding which wonderful tales are told †; and, contrary to the opinion of Povelsen, who considers it *Mus sylvaticus*, L., and of the intelligent Icelanders, who, as represented by Sir W. J. Hooker, do not believe in its existence, thinks that it is *Myodes torquatus* (*hudsonius*, Forst.=*grönlandicus*, Tr.). If such is the case, it might have been brought over on ice from the east coast of Greenland; but the probability is that it does not exist, and that the only Mice in Iceland are the ones introduced by man, the ordinary *Mus decumanus* and *M. musculus*, almost cosmopolitan in their range.

From these facts I believe that the island of Iceland is of a newer date than any portion of Scandinavia or Greenland, and, being of a volcanic nature, was formed posterior to the date of the present distribution of land and water in the North Sea. I can see no other conclusion which can be arrived at ‡.

4. *Notes on the Habits, Distribution, and Synonymy of the Terrestrial Mammalia of Greenland.*

The following notes on certain of the terrestrial species of Mammalia are not intended as either a complete or systematic history of the species, but merely as stray notes on some points in their history hitherto passed over, and on the *species as a Greenland animal*. I have delayed entering upon the history of the Marine Mammalia until another time, my observations on these species being too extensive to be included within the limits of one paper; and, as I shall treat of them on a more comprehensive plan than as mere Greenland species, they do not properly come within the scope of a paper on Greenland Mammals.

These notes comprehend my own observations during voyages to the Spitzbergen, Iceland, and Jan Mayen seas, and along the eastern and western shores of Davis's Strait and Baffin's Bay, to near the mouth of Smith's Sound, in 1861. During the past summer I have again visited Danish Greenland for scientific purposes, but have added little or nothing to my former notes, having seen few Mammalia, except some of the species of Pinnipedia and a Cetacean or two in the sea, and, from our travels extending over but a limited portion of the vicinity of Disco Bay, had but few opportunities of adding to our knowledge of their habits.

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* Geographical Distribution of Mammals (1866).

† Pennant, 'Arctic Zoology,' Introduction, p. lxx; Hooker's 'Tour in Iceland,' i. pp. 51–52.

‡ *Vide* J. D. Hooker, Linn. Trans. 1862; Asa Gray, 'American Journal of Science,' 1862; J. W. Dawson, 'Canadian Naturalist and Geologist,' 1862, pp. 334–344; and Murray, 'Geogr. Dist. Mamm.,' for the phytogeographical views of the origin of the Greenland flora and fauna at present received.

I was fortunate enough, however, to obtain the assistance of my friends Herren Knud Gelmeyden Fleischer, Carl Bolbroe, and Octavius Neilsen, whose long acquaintance with the Eskimo language enabled me to discover some of the errors which Fabricius fell into in deciphering the mythical species; and our intelligent travelling companion Hr. Anthon P. Tegner kindly gave me the benefit of his experience. These notes I have incorporated in the body of this paper at the proper place.

I have also examined, through the kindness of the curators, the Greenland Mammals in the Copenhagen Museums, and those in the Museum of Science and Art in Edinburgh, comprising many of the the typical specimens of Scoresby, Richardson, &c. For this latter favour my thanks are especially due to Professors Archer and Allman and to Mr. J. B. Davies.

1. URSUS MARITIMUS, Linn.

Grœnl. Nennok (*o* guttural).

The well-known "Polar" or "Ice Bear" is found along the whole coast of Greenland from north to south, but not nearly so numerous as in former times, or as is popularly supposed. There are more in the northern than in the southern portion of the country; and it is very seldom seen in mid-Greenland, *i. e.* between about 69° and 66° N. lat. There are yearly killed from thirty to sixty of them. The Company of Royal Merchants in Greenland give the natives about five rigsdaler (11*s.* 3*d.*) for the skins. Occasionally there are a number killed near Cape Farewell which have come round on the annual ice-drift. Here a curious custom prevails, viz., that whosoever sights the Bear first, man, woman, or child, is entitled to the skin, and the person who has shot it only to the blubber and flesh*. It is of light creamy colour, rarely pure white, except when young; hence the Scotch whalers call it the "Brounie" or "Brownie," and sometimes the "Farmer," from its very agricultural appearance as it stalks leisurely over the furrowed fields of ice. Its principal food consists of Seals, which it persecutes most indefatigably; but it is somewhat omnivorous in its diet, and will often clear an islet of eider-duck eggs in the course of a few hours. I have seen it watch a Seal for half a day, the Seal continually escaping just as the Bear was about putting its paw on it, at the "*atluk*" (or escape hole) in the ice. Finally, it tried to circumvent its prey in another manner. It swam off to a distance, and when the Seal was again half asleep at its *atluk*, the Bear swam under the ice, with a view to cut off its retreat. It failed, however, and the Seal finally escaped. The rage of the animal was boundless; it roared hideously, tossing the snow in the air, and trotted off in a most indignant state of mind!

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* The flesh, and especially the liver, is said to often prove poisonous when eaten. The Eskimo on the western shores of Davis's Strait, carefully prohibit their dogs from devouring any portion of it.

During the Sealing-season, both in Greenland and in the Spitzbergen seas, the Bear is a constant attendant on the sealer for the sake of the carcasses, in the pursuit of which it is sometimes "more free than welcome." I have often also seen it feeding on Whales of different species, which are found floating dead. In 1861 I saw upwards of twenty all busily devouring the huge inflated carcass of a *Balæna mysticetus* in Pond's Bay, on the western shores of Davis's Strait. We were foolish enough to fire a few shots among them, when the Bears sprang furiously from the carcass and made for our boat. One succeeded in getting its paws on to the gunwale; and it was only by the vigorous application of an axe that we succeeded in relieving ourselves of so unwelcome an addition to our crew.

On the whole, I do not think that the Polar Bear is a very fierce animal, when not enraged; and I cannot help thinking that a great deal of the impressions which we have imbibed regarding its ferocity are more due to old notions of what it *ought to be*, rather than what *it is*, and that the tales related by Barentz, Edward Pelham, and other old navigators regarding its bloodthirstiness during the time they wintered in Spitzbergen were a good deal exaggerated. When enraged, or emboldened by hunger, I can, however, quite well understand that, like all wild, and even domesticated animals, it may be dangerous to man. I have chased it over the floes of Pond's Bay; and the Bear's only thought seemed to be how best to escape from its pursuers. I should have hesitated a good deal before making so free with the grizzly bear of the Californian wilds (*Ursus ferox*), which is, perhaps, the most ferocious animal on the American continent. Though seemingly so unwieldy, the *nennok* runs with great speed; and being almost marine in its habits, it swims well. I have chased it with a picked crew of eight whalemen, and yet the Bear has managed to distance us in the race for the ice-fields. It would every now and again, when its two cubs were getting left in the rear, stop and (literally) push them up behind; and on reaching the steep edge of the ice-floe, finding that we were fast reaching them, it lifted each of them up on the ice with its teeth, seizing the loose skin at the back of the neck. Once on the ice, they were safe.

It is often found swimming at great distances from land (*vide* the statements in 'Arctic Voyages,' and the works of Richardson, Parry, &c., *passim*). The stories of its making ice-houses, and of their gambols therein, as related by Fabricius, as well as of its combats with the Walrus, are still prevalent in Greenland.

It is curious that the old Eskimo stories about the Polar Bear having no evacuations during the season of hybernation, and being itself the means of preventing them by stopping all the natural passages with moss, grass, or earth (Richardson's 'Fauna Bor.-Am.' i. 34), prevail also among the North-western American Indians on the other side of the continent, in reference to the Brown Bear (*Ursus americanus*), the substance used in stopping the passages varying according to the tribe among whom the myth is prevalent, from a ball of clay to one of pine-resin!

I do not think that it hybernates during the whole winter, as usually supposed; at all events they are often seen during the winter, though these are probably old males. It is probable that the females, when not pregnant, roam all winter like the males. Unlike its congeners, it does not *hug*, but *bites*; and it will not eat its prey until it is dead, playing with it like a cat with a mouse. I have known many men who, while sitting watching or skinning Seals, have had its rough hand laid on their shoulder. Their only chance has been then to feign being dead, and manage to shoot it while the Bear was sitting at a distance watching its intended victim. Though Eskimo are often seen who have been scarred by it, yet I repeat that, unless attacked, or rendered fierce by hunger, it rarely attacks man. During our last trip to Greenland none of our party saw one; indeed they are only killed in the vicinity of Disco Bay during the winter or spring, when they have either come or drifted south on the ice-floes. Six were killed in the vicinity of Omenak during the winter of 1866–67.

2. VULPES LAGOPUS (Linn.); Rich. F. B. A. i. 83.

Grœnl. Terienniak, Kaka.

The Arctic Fox is very numerous in south and mid Greenland, more seldom in the north of the Danish possessions, but is quite plentiful again north of Upernavik to high up in Smith's Sound.

There are two varieties, the blue and the white. This colour is not dependent on the season. The white variety is also more numerous and much less valued than the blue; but, again, the blue and the white varieties interbreed, and often, the Eskimo say, there is a white mother with blue young, and *vice versâ*. The blue Fox is very valuable, the price for the best kind of skin being from six to seven times as much as for that of the white. Some have been sold at the annual auction of the Greenland furs, in Copenhagen, at over twenty rigsdaler (nine rigsdaler = £1 sterling). There are yearly killed from 1000 to 3000 of the white and blue foxes, two-thirds being blue and one-third white. In Greenland the white is traded for three marks (1*s*. 1½*d*.), and the blue for two rigsdaler (4*s*. 6*d*.). It is not killed by the Greenlanders in summer, as its summer coat is not valuable. At this time it is found in the mountains preying on the young Ptarmigan (*Tetrao reinhardti*, Brehm). In winter it comes down to prey on shellfish or other marine produce, at the open places near the shore when the tide breaks the ice. About this period it can often be seen barking most impudently at the solitary hunter.

3. CANIS FAMILIARIS, Linn.

a. Var. *borealis*.

Grœnl. Kemmek or Kremmek.

(*a*) The Dog of the Eskimo is the same species all over the

American continent; at least, I have seen dogs from Kamschatka, Sitka, the western shores of Davis's Strait, and from Greenland which it was impossible to deny were of one species.

(β) Besides this there is, in Danish Greenland, another breed of Dogs of mixed native and European descent, the latter being imported by the whites. These are called by the natives "Meĕkĕ." I have not the slightest doubt that the original breed of the Arctic Dog was the Wolf (*Canis occidentalis*, var. *griseo-albus*, Baird). In its every disposition it agrees with that animal, and there is no point which has been supposed to separate the one from the other which is not common to both of them. I have seen skins of the Wolf which have hair for hair agreed with the typical Arctic Dog. The Wolf is not, however, found in Greenland, unless, as I shall afterwards discuss, the "Amarok," which Fabricius erroneously described in his fauna as *Ursus luscus*, be merely a Dog run wild and returned to its original type. The Dog is found as far north as man lives, but is not used by the Eskimo south of Holsteensborg, the sea not being sufficiently frozen over during the winter to permit of sledging. The use of the Dog as a sledge-animal has been so often described* that I may pass it over here without further reference. Being only required during the winter, they lead during the summer and autumn months an idle life, hanging round the settlements, sleeping on the top of the flat earth-huts of their masters, snarling at every one's heels, but running at the first appearance of a stick or stone, snatching up every bit of edible garbage round a village, and, in fact, becoming such a pest to the women when pressing a seal on the rocks, or when drying meat for winter use, that they are often left to look out for themselves on some barren uninhabited islet. During the summer they are never fed; and often you may pass old Eskimo encampments where the only inhabitants are a few hungry dogs howling from the rock, disconsolate until their lords return. The *appearance* of a stone is enough to send them howling far and near. It is rarely that they bark, generally preferring, with their wolfish instinct, to sit and howl monotonously on some elevated point, and regularly "making night horrible" with their "long cry." The ringing of the workmen's morning and evening bell at the Danish settlements used to be the signal for the commencement of this hyperborean music. It can only be kept in subjection by being treated to the most unmerciful lashing; for its savage nature will out. When at Clyde River in 1861 I heard of a most horrible tragedy which had been enacted there a few years before. A man, a boy, and a little girl landed from an *omiak* (or open skin boat) on an island where, as is usual, some dogs were confined. Before the poor people could escape to their boat, the animals, infuriated by hunger, sprang upon them. The man and the boy, though much lacerated, managed to regain the omiak; but the poor girl was torn to pieces.

When the Greenland dogs die off, the Greenlander must become extinct, more certainly even than must the "Plain" Indian when the last buffalo is shot. It is impossible for him to drag home the seals, sharks, white whales, or Narwhals which he may have shot in the winter at the "strom-holes" in the ice without his dogs—or for the wild native in the Far North to make his long migrations, with his family and household goods, from one hunting-ground to another without these domestic animals of his. Yet that sad event seems to be not far distant. About fifteen years ago, a curious disease, the nature of which has puzzled veterinarians, appeared among the Arctic dogs, from high up in Smith's Sound down the whole coast of Greenland to Jakobshavn (69° 13′ N. lat.), where the ice-fjord stops it from going further south; and the government uses every endeavour to stop its spread beyond that barrier, by preventing the native dogs north and south from commingling. Kane and Hayes lost most of their dogs through this disease; and at every settlement in Danish Greenland the natives are impoverished through the death of their teams. It is noticed that whenever a native loses his dogs he goes very rapidly downhill in the sliding scale of Arctic respectability, becoming a sort of hanger-on of the fortunate possessor of a sledge-team.

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* *Vide* particularly Kane, 'Arctic Explorations,' and Hayes, 'Voyage towards the open Polar Sea.'

During the latter portion of our stay in Jakobshavn, scarcely a day elapsed during which some of the dogs were not ordered to be killed, on account of their having caught this fatal epidemic.

The Dog is seized with madness, bites at all other dogs, and even at human beings. It is soon unable to swallow its food, and constipation ensues. It howls loudly during the continuance of the disease, but generally dies in the course of a day, with its teeth firmly transfixing its tongue. It has thus something of the nature of hydrophobia, but differs from that disease in not being communicable by bite, though otherwise contagious among dogs. The government sent out a veterinary surgeon to investigate the nature of the distemper; but he failed to suggest any remedy, and it is now being "stamped out" by killing the dogs whenever seized—an heroic mode of treatment, which will only be successful when the last dog becomes extinct in Greenland.

Strange to say, the dogs in Kamschatka are also being decimated by a very similar disease; and, in a recent communication received from that region, it is said that so scarce have dogs become, that the natives do not care to sell them, and that 100 roubles have been refused for a team of six. Fortunately for the Kamschatkans, they have the Reindeer as an ulterior beast of draught and burden. Hr. Otto Torell brought several dogs from Greenland for the use of his expedition to Spitzbergen in 1861; but I believe that, finding them useless (on account of open water), he set them free on Spitzbergen, where they are now rapidly increasing, and will, doubtless, soon return to the original Wolf type.

Their use in Greenland is almost wholly as sledge-animals. Among the Eskimo on the western shores of Davis's Strait, a loose dog usually precedes the sledge, and, by carefully avoiding broken places in the ice, acts as a guide to the sledge-team, which carefully follows his lead. *En passant* I may remark that dog-driving is by no means an easily acquired or a light labour. In North Greenland and among the wild Arctic highlanders of Cape York and Smith's Sound, dogs are also valuable assistants, by attacking the Polar Bear while the hunter plants his spears in the animal*. They are also used a little in Seal-hunting. Their flesh is also highly appreciated, but rather too valuable for anything except an occasional dainty. The skin is highly valued for socks, and that of the pups for winter clothing; but so scarce have they become, that it is now very hard to raise enough for an *anarak* (jumper), and one of our party paid 18 rigsdaler (£2) for enough to make an overcoat. No longer, as in Giesecke's day†, is it rejected as an article of trade on account of its disagreeable odour.

[4. Felis domestica, Briss.

Grœnl. Kitsungoak.

The Domestic Cat has been kept in Greenland ever since the Danish women came, and it follows them in all their sojournings north and south. In Fabricius's day it was already not uncommon. At present there are many in Julianeshaab district, where mice are quite abundant and troublesome.]

5. Myodes torquatus (Pall.), Keys. & Blas.

This Lemming was found by Capt. Scoresby, in the year 1822, near Scoresby's Sound, on the east coast of Greenland, lat. 69°, and was described by the late Professor Traill, in the Appendix to Scoresby's Voyage to Greenland, as a new species under the name of *Mus grœnlandicus*. From a careful examination of the original and only specimen, now in the Edinburgh Museum of Science and Art, I am inclined to believe, with Middendorff‡, that it is not distinct from those already described, and that the *Myodes hudsonius* of Forster (*Mus hudsonius*, Forster in Phil. Trans. lxii. p. 379; *Lemmus hudsonius*, Sab., Parry's Voyage, p. clxxxv) and the *Mus grœnlandicus*, Tr. (*Myodes grœnlandicus*, Wag. and J. E. Gray §, Proc. Zool. Soc. London, xvi. 1848, p. 43, and *Id.* in Rae's Narrative, 1850), are identical with the Siberian *Myodes torquatus* (Pall.), Keys. & Blas.

It can only be classed as a very rare and local (possibly accidental) member of the fauna of Greenland, as it has never since been found in the country; Graah ‖ did not see it in his two years' journey, nor even hear of its existence. No doubt the east coast of Greenland is almost unapproachable for ice, and has never been visited since Graah's day, except for a little way round Cape Farewell. Whalers, however, have been known to have landed near Scoresby's Sound; but they saw nothing of it, and it may be safely said not to be an inhabitant of the west coast, either within or outside of the Danish possessions.

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* *Vide* an interesting account in Kane's 'Arctic Explorations.'

† Giesecke, article "Greenland," in 'Brewster's Encyclopædia.'

‡ Sib. Reise, II. ii. 1853, p. 87, pls. 4–7 & 10.

§ *Arvicola grœnlandiæ*, Rich. *l. c.* 134; *vide* also Schreber, 'Säugethiere,' iii. p. 604; Giebel, 'Die Säugethiere' &c. (1859), p. 605.

‖ Narrative of an Expedition to the East Coast of Greenland, Engl. transl. (1837). The original Danish edition in 4to (Undersögelses-Reise til Ostkysten af Grönland, 1832), however, is much superior in many respects.

From Upernavik southward, the Danes have been on the coast, either settled or trading, for at least 120 years, and during that time not a few collectors have visited the country; but, notwithstanding all their exertions and those of the stationary officers of the government there, no specimen of this Mouse has as yet been obtained, nor do the Eskimo know of the existence of such. Murray has therefore taken too wide a generalization, when he portrays, on map lxxxv. of his laborious and generally accurate work the 'Geographical Distribution of Mammals' (1866), p. 267, the distribution of the Lemming as extending right along the east and western shores of Greenland to the head of Baffin's Bay, on the supposition that it is a regular member of the Greenland fauna. I am inclined to look upon it as representing the extreme *eastern* limit of the *Myodes torquatus*, as the *Myodes hudsonius* is a climatic species representing the extreme *western* range of the former species. It is almost unnecessary to note, after what I have said, that Fabricius makes no mention of it in his 'Fauna Grœnlandica;' and if it had been found, he, ever anxious as he was to add anything to the Greenland Mammals, would have been sure to have heard of it from the natives, credence in whose mythical zoology forms one of the few disfigurations of his work. Neither did Ingelfield, Sutherland, Kane, or Hayes see anything of it in Smith's Sound, or southward to the northern limits of the Danish possessions.

In 1861, the natives at Pond's Bay, on the western shore of Davis's Strait, brought me many skins of this species, which I ascertained to belong to the *hudsonius* form. For the sake of reference, the Arctic species may be classed as follows:—

MYODES TORQUATUS, Pall.

Var. *hudsonius*, Forst.

Var. *grönlandicus*, Tr.

6. [MUS DECUMANUS, Pall. (1778).

Mus norvegicus, Erxleben (1776).
Grœnl. Teriak.

The brown Rat was introduced as far back as the days of Fabricius by the Danish ships in the summer, and seemed likely to prove dangerous in houses; but they gradually and periodically died out, as they could not stand the cold of the winter. Some years ago they were again introduced, and still occasionally one is seen in the summer months in some of the warehouses from Upernavik to near Cape Farewell.]

7. [MUS MUSCULUS, Linn.

Grœnl. Teriangoak ("the small Rat").

Its history as a colonist animal in Greenland is about the same as the Rat's. At some of the more southern settlements they can occasionally survive the winter and beget abundantly. Both the Mouse and Rat were introduced as far north as Kane's and Hayes's ships wintered, but I cannot learn that they got naturalized.]

8. Lepus glacialis, Leach.

L. arcticus, ibid.

Grœnl. Ukalek.

The Hare is a common animal over the whole coast, from north to south, east and west. It is, however, seen more seldom in the north of the Danish trading-limits, and there are only a few hundreds shot annually. They are said to be rather rare on the east coast. I cannot see why its beautiful white skin is not more used. At one time the Danes used to send quantities home, but they could get no market for it. From the Hare the natives spin a kind of yarn which they occasionally knit into caps, for a summer head-dress, for the men and children. It is difficult (indeed, almost impossible) to give characters whereby this species can be separated from the *Lepus variabilis* of Europe when the former is in its summer dress; and the skull presents equal difficulties.

I have, however, preferred to look upon it as nominally distinct, though I really believe that it is only a climatic variety of *L. variabilis*, Pallas.

9. [Sus scrofa, Linn.

Grœnl. Poliké.

It is kept at some of the southern settlements.]

10. Ovibos moschatus (Gmel.), Blainv.

Grœnl. et Esk. Umimak.

In the 'Fauna Grœnlandica,' p. 28. no. 17, Fabricius has classed *Bos grunniens*, L., as one of the animals of Greenland, because he thought that he had found (on a piece of drift ice) some remains of it, consisting of the greater portion of the skull of an animal "very like an Ox." He was of opinion that this was a portion of the Yak. He did not, however, consider it to be a native of Greenland, but rather to have been drifted from northern Asia on the ice, the flesh having been eaten by Polar Bears. Any one can see, by examining the figure which Fabricius afterwards gave of this specimen (Bid. Selsk. Skriv. N. Saml. iii. 82), that it was the Musk-Ox; and, indeed, he afterwards acknowledged so himself (Bid. Selsk. Skr. 3. N., vi.). It is therefore, after this, somewhat surprising to find a zoologist so well acquainted with the Greenland fauna as the elder Reinhardt stating that the Musk-Ox, which, like Fabricius, he called *Bos grunniens*, rarely comes from Melville Island to Greenland*. Mr. Murray seems to doubt on which side of Greenland Fabricius met with his specimen; but there need be no doubt on that matter, as it must have been on the west side. The east was even more unknown in his day than now, and he was certainly never round Cape Farewell. The Musk-Ox has, therefore, no right to a place in the fauna of Danish Greenland, nor do I believe that at any time it was an inhabitant of that portion of the continent.

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* Isis, 1848, p. 248; Schmarda's 'Geograph. Verbreitung (1853), p. 370; *fide* Murray's 'Geogr. Dist. of the Mammals,' p. 140.

Recent discoveries have, however, shown it to be, with the strongest probability, an inhabitant of the shores of Greenland north of the glaciers of Melville Bay. Dr. Kane met with numerous traces of it in Smith's Sound; and his successor, Dr. Hayes, found at Chester valley in the same inlet, among Eskimo kjœkkenmœddings, the skull of a Musk-Ox. Eskimo tradition describes the animal as at one time common along the whole coast, and they affirm that it is yet occasionally to be met with. No longer ago than in the winter of 1859 a hunter of Wolstenholme Sound, near a place called Oomeak, came upon two animals, and killed one of them *.

I think, therefore, that we may with some authority assume that the Musk-Ox is not yet extinct in Greenland.

11. RANGIFER TARANDUS (Linn.), Baird.

Var. *grœnlandicus,* Kerr (Linn. 1792, p. 297).

Grœnl. Tukto (tootoo); ♂, Pangnek; ♀, Kollauak.

I will not here enter into any discussion of the vexed question of the identity of the European and American Reindeers, or whether the Greenland Reindeer is specifically distinct from the American species; suffice it to say that the heading of this note sufficiently expresses my views on the subject, after very excellent opportunities of comparison and study, and that I consider the Greenland Reindeer only a climatic variety of the European species. I have, moreover, seen specimens of Reindeer horns from Greenland which could not be distinguished from European, and *vice versâ.* On the whole, however, there is a slight variation, which may be expressed by the trivial name to which I have referred at the commencement of these remarks†.

It is found over the whole country, from north to south ‡, but not nearly so plentiful as it used to be. Indeed it is fast on the decrease, on account of the unmerciful way in which it is slaughtered by the natives for the skin alone, as is the buffalo in America. The skins are a great article of commerce; sometimes they sell in Copenhagen at from 3 to 7 rigsdaler (6*s.* 9*d.* to 15*s.* 9*d.*) each, according to the quality. (The natives get in Greenland only 72 skillings (1*s.* 6*d.*) for them). The yearly production used to be in the summer time from 10,000 to 20,000, but it is now on the decrease.

Dr. Hayes fed his party luxuriously on them all winter at Port Foulke in Smith's Sound, not many miles from where Kane's party starved a few years before. Behind Holsteensborg are valleys full of Reindeer; and I have heard tales of people climbing the hills in that vicinity, and looking down into glens where the Reindeer were so numerous that they might be supposed to be the herds of a wealthy Laplander. Ten thousand skins were shipped from that port some years ago. They are slaughtered indiscriminately by the natives—these improvident people, in nine cases out of ten, leaving the hides and flesh, and only taking the tongues. They are bad-enough shots; and the Danish traders supply them with powder at less than prime cost (viz. 36 skillings, or 9*d.*, per lb.), with a view to increase the produce of the hunt; but this ammunition is wasted in a most reckless manner.

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* Hayes's Voyage towards the North Pole (1866), p. 390.

† *Vide* Murray, Edinb. New Philosophical Journal, Jan. and April, 1859; Newton in Proc. Zool. Soc. 1864; Murray, Geog. Distrib. of Mammals, p. 150 *et seq.*; Baird, North Am. Mammals; *id.* U. S. Pat. Office Rep. (Agric.) 1851 (1852), p. 105.

‡ Rarer on the east coast (apparently).

On the way to and from these hunts up the fjords ("the interior country," though really the natives know of no place off the coast more than the Europeans do), with that savage desire to *kill* every living thing, ducks are shot and left lying, or, if they feel hungry, they will tear off the titbits: a Ptarmigan will be shot sitting on its eggs, and the ball cut out of its body to be again used in this murderous sport. There is no necessity for it; for at this time they are abundantly supplied with food, even to excess. It is, however, the season of sport and fun, looked forward to by the natives much in the same light as we do to our grouse-shooting or deer-stalking, and is about as profitable to all parties concerned. In order to pursue this they leave the more lucrative Seal-fishery, and neglect to lay in a winter's supply of food; so that when the "banyan" days come they bitterly regret their folly, and weary for the bleached carcasses up the frozen fjords. Notwithstanding this, regularly as the season comes round they are off again to the shooting from far and near, and repeat the same improvident course: nor, if they like it, has anybody a right to complain. In all verity, enjoyments few enough fall to the lot of these hyperborean hunters.

However, the effect of this indiscriminate slaughter is now being felt in the decrease of the Reindeer in many parts where they were once common. They are no longer found on Disco Island, as in the days of Cranz and Fabricius. Indeed there are now very few shot in mid-Greenland, and many of the natives are giving up the hunt for them altogether. During the summer of 1867 only five Reindeer were killed in the district of Ritenbenk (lat. 69° 45′ N.). The yearly average had been about twenty or thirty; but the Governor informs me that in his opinion Reindeer-hunting-days are nearly over in that section of the country. In the districts of Jakobshavn, Clavshavn, and Christianshaab I did not learn that one had been killed. At Clavshavn a few natives went out hunting, but met with bad weather, and returned for good, having only seen two animals altogether, and shot nothing.

In the southern portion of the country more are seen, not so much on the coast as up the valleys by the fjords. It is in May or June that most of the natives leave their winter houses, and go Reindeer-hunting. When they do dry any meat, they cover it up in *caches*. The dogs are not taken along with them. In old times, even making every allowance for exaggeration, the Reindeer seems to have been very numerous. In the Icelandic 'Sagas' they are spoken of as having been very numerous in the Œster Bygd.

Four hundred years ago the natives seem by these accounts to have hunted the Reindeer much in that section generally supposed to be the site of the Œster Bygd (viz. Julianeshaab district). At the present day they have left that district; and it is now nearly sixty years since any have been shot there. Latterly the hunting has been better in Greenland (south). From 1840 to 1845 many were got; and within the last few years they seem (if we might judge by the produce of the hunt) to be on the increase. This, however, is, doubtless, owing a good deal to the use of the rifle; but it is very questionable whether this will not again decrease their numbers, as it seems to have done elsewhere. Necessarily we have no better data to go upon than that so many skins have been traded; but if this is to be received as evidence, more have been traded of late years.

When the hunting was at its best it was at the positions where the country was broadest, or where the great *mer de glace* of the interior was most distant from the coast, viz. Holsteensborg, Sukkertoppen, Godthaab, and Fiskernaæsset. Now there are very few killed at the last-named place. Godthaab also yields few; but the Holsteensborg and Sukkertoppen natives have taken a good many of late. At Holsteensborg (formerly mentioned as a favourite locality) the hunting-ground is behind the large inlets, where the ice lies far back, and where land most free from ice has been found. The Reindeer, living in very large herds, require always to be on the look-out for an extensive feeding-range; and it has been observed that they are going south, in the direction of Julianeshaab; and individuals have been annually shot not far from Fredrikshaab. In order to hunt the Reindeer, the natives go every year, in the month of June, from the southern districts to the two northern districts in the Southern Inspectorate, and return in September. A good number are also shot in the winter time; and not unfrequently, in very snowy winters, they have been known to come down close to the settlements, and the natives have shot them standing in their doorways. The story of the Reindeer going into the *interior* in the winter is founded on erroneous notions of what the interior is. They no doubt go a little way into the valleys; but as for going into the interior, that is a physical impossibility; for the interior is merely one wide frozen waste, surrounded by a circlet of islands. It is to the valleys of these islands that the Reindeer undoubtedly retire; but nobody travels very far afield in Greenland during the winter season, so that we have no means of arriving at a very accurate confirmation of this supposition. Dr. Hayes's people finding them in such abundance at their winterquarters goes further to prove this. One of his men described to me the party as going over a little ridge, and finding the Deer as if in a preserve, like the cattle in the pastures of his native Jutland: "we just shot them as we wanted them" *.

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* *Vide* also Hayes's 'Open Polar Sea,' *passim.*

Their food in Greenland consists chiefly of various species of *Empetrum, Vaccinium, Betula,* &c.; and I can hardly think that the traditional "reindeer-moss" (*Cladonia* of various species) forms any great portion of its subsistence, as that lichen is nowhere found in Greenland in such quantity as to afford food for any animal *.

The Greenlanders have no idea of taming the animal; indeed its use to them would be trifling, as it cannot travel well on ice, and the difficulties of transporting supplies of food for it on their long ice-journeys would be great. The Eskimo's sledge-travelling is almost wholly confined to the frozen surface of the sea in winter; and for this purpose dogs answer much better. The meat is very good; and the natives eat the half-digested vegetable contents of the stomach along with blubber as a choice delicacy. They prefer to eat the flesh in a putrid state. It is, with the exception of the breast, for the most part lean. Clothes and thread are made from the skin and sinews. The latter is much sought after in districts where there are no Reindeer. From the horn are made all sorts of native implements; but commercially it is of no value in Copenhagen. However, I think its importation ought to answer, if brought to England, though to Denmark it will not pay the freight.

A calculation has been made that from 1840–45 there were about 2500 persons living in the principal Reindeer district. Every family of five persons, it was calculated, would use two skins &c., which would make 5000 for themselves; and they sent home 11,500; the total hunt was therefore calculated to be about 16,000 annually. This sum has been taken for a minimum; for every hunter, besides using the skins for clothes, not only for himself and family, also used them for tents, partitions in houses, and for socks &c., so that the number killed was in all likelihood much greater. Of late years the skins traded by the natives have decreased one half. Between 1851 and 1855 there were annually shot 8500 Deer. It is difficult to say how much meat has been consumed in that period; but every Deer may be put down at 80 lbs. of meat alone. This makes the meat, between 1840 and 1845, amount to 1,280,000 lbs. annually, and between 1851 and 1855 to 680,000 lbs.

The Reindeer is often shot in situations where it is impossible for the hunter to carry the meat down, when it becomes a prey to wild beasts and birds. The quantity of meat thus lost is enormous, independently of much more wastefully destroyed, as described in the first portion of these notes. It is so great that, during the period first referred to, fully one half was thrown away, and during the last period a quarter. The tallow in a large Deer will weigh from 8 to 12 lbs. The tongues are first cut out, after the Reindeer is killed. About 3000 to 4000 lbs. of Reindeer-horn must be used by the natives in South Greenland. The trader at Holsteensborg has

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* On the western shores of Davis's Strait I have known them to come down to feed upon the *fuci* exposed at low water, as do the cattle and red deer in some places in the north of Scotland.

(or at least had a few years ago) more than 60,000 lbs. of it lying on the ground in a heap*.

I have gone into the history of the Reindeer in Greenland at some length, because I found that though the Reindeer in Lapland is familiar to many, yet the animal in its wild state is much less known, and I have seen most erroneous statements regarding its distribution in Greenland.

12. [OVIS ARIES, Linn.

Grœnl. Saua.

At present it is only known in the district of Julianeshaab, to the number of between twenty and thirty. It was already introduced in Fabricius's day. In the summer they feed in the valleys, and in the winter are kept under shelter. They cannot, therefore (nor, indeed, can any of the colonist fauna), be said to be acclimatized.]

13. [BOS TAURUS, Linn.

Grœnl. Unnimak.

At present there are thirty or forty grazing about in the southern valleys during the summer, and kept at stall in the winter. Some of the more enterprising natives also keep a few cows. I was told by the Danish residents that though there was quite enough grass occasionally found round the settlements in the summer, even further north, they could not be kept on account of the dogs. The old Icelandic Sagas describe the Norsemen as keeping herds of cattle in the valleys of Greenland up to the Middle Ages; and I have no doubt of the accuracy of the statement. The place where they prosper best now is just on the site of one of these ancient colonies. If they left any behind them when the colonies were exterminated by the Eskimo, who about this period make their appearance in South Greenland, they must have died out, or, more likely, were slaughtered by the natives (if a people who, to all appearance, were only wandering hordes who had now for the first time crossed Melville Bay from the north, can be so styled); for when Greenland was again visited by the Europeans no cattle were found. It is somewhat curious that the Greenlanders apply the Eskimo name of the *Musk-Ox* to the domestic Ox, showing a recollection of the existence of the former in the land they came from, though it is no longer a native of Greenland to the south of Cape York.]

14. [CAPRA HIRCUS, Linn.

Grœnl. Sauarsuk.

As far back as the days of Fabricius, the Goat had been introduced into the southern settlements of Greenland, and was found profitable; they feed on the grass which springs about the old

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* For many of the foregoing statements I am indebted to Dr. Rink, Royal Inspector of South Greenland, whose work (Grönland Geographisk og Statistisk, &c.) is the standard on all subjects connected with that country.

Eskimo camping-places in the summer, and are housed in the winter. I am told that they will eat dried Arctic Salmon, if nothing better is forthcoming. It is not kept north of Holsteensborg, as it is found impossible to keep it where there are troops of savage dogs; and it is accordingly only found about the settlements south of that, to the number of about 100.]

5. *On some of the doubtful or mythical Animals of Greenland.*

Otto Fabricius used to spend his summers roaming about with the Eskimo, until he had learned to manage a kayak and strike a Seal with a skill which few Europeans can ever acquire. On one of these excursions he found in "Sildefjord, north of the colony of Fredrikshaab," a piece of a skull, about which the natives told him something; and from what they related to him, and what he thought himself, he entered no less than two species in the Greenland fauna, "*Trichechus manatus*" (*Rhytina gigas*) and "*Phoca ursina*" (*Callorhinus ursinus*), being, apparently, not certain to which it belonged. The Greenlanders called this animal *Auvekæjak*, or *Auikæjak*, and said it was like a Walrus and broke things easily to pieces. He was sure that the piece of skull belonged to the first of these animals; and again he repeats the same under the head of *Phoca ursina*; so that it is now difficult to arrive at any conclusion regarding the species of animal to which it belonged. However, I think there can be but one opinion, that neither the Sea-Bear nor the *Rhytina* can be entered in the Greenland fauna on such fragmentary evidence. The confused stories of the Greenlanders can give the critic no great hold.

This piece of cranium is not now to be found in Fabricius's Museum. In a posthumous zoological manuscript, entitled "Zoologiske Samlinger," written in Copenhagen during the period between 1808 and 1814, and now preserved in the Royal Library, he has again spoken about the *Auvekæjak* (Bd. ii. p. 298, no. 286), and has thus written about the skull he found in Greenland:—

"The head which I found was full of holes, and looked like that of a Walrus (no. 82), without tusks."

There were many long small teeth in the head *; and if such was the case, we cannot be wrong in saying that the animal was not a Mammal. We have, however, no right, when we remember the clear comprehensive style in which Fabricius wrote regarding the Greenland fauna, however much we may be inclined, to say that the whole was erroneous.

It is unfortunate that when Fabricius referred his *Auvekæjak* to the Sea-cow of Steller, he was not acquainted with that animal, and did not know of the horn-plates; for, if he had, it is impossible that he could have found a resemblance to it in the Auvekæjak. His words regarding it are clear enough, so far as they go—"Rarissimum animal in mari Grœnlandico, cujus solum cranium ex parte conservatum commune cum sequenti specie ab incolis dictum nomine Auvekæjak, vidi, inque hoc dentes spurios tales confertim congestos quales Steller" (*vid. loc. cit.* Adel.* § 189). Again, immediately under the head of "*Phoca ursina,*" he says:—" Grœnl. AUVEKÆJAK.—Illam esse animal quod sub nomine hoc memorant incolæ non est dubitandum. Dicunt illud in Australiori Grœnlandia, licet raro, dari quadrupes pilosum, crociter omne occurrens dilacerare, et si visum consumere: ursi maritimi more terra marique degere, impetuosissime natare, venatores valide infestare. Dentes ut amuleta contra ulcera, nec non quodammodo ad instrumenta venatoria adhibentur." There is an evident uncertainty in Fabricius's mind; and he has listened too much to the idle fables of the natives (who have, as I shall presently show, many of that nature); whatever it is, there can, I think, be scarcely a doubt as to the exclusion of *Trichechus manatus* and *Phoca ursina* from the Greenland fauna; nor can their place as yet be supplied by any other species. Prof. Steenstrup thinks that it was a portion of the skull of the Sea-wolf (*Anarrhichas*). The situation of the teeth and the nature of this fish's cellular skull well agree with his description of the skull as "full of holes" (forhulret†). Hr. Bolbrœ, who understands the Eskimo language intimately, tells me that the word means a "little Walrus," and that in all probability it was only the skull of a young Walrus, an animal not at all familiar to Fabricius, as they are chiefly confined to one spot, and the natives fear to go near that locality. Fabricius may have only written the description from recollection; and memory, assisted by preconceived notions, may have led him into error in the description of the long teeth, which after all might, without great trouble, be made to refer to the dentition of the young Walrus as described by Macgillivray‡ and Rüppell§.

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* Reinhardt, *loc. cit.* p. 6.

This opinion is strengthened by a passage in Fabricius's account of the Walrus, when he again is in doubt whether a certain animal is the young of the Walrus or the Dugong, "De varietate dentibus exertis brevioribus loquuntur incolæ, quam minus recte (ut videtur) ad *Phocas* referunt, si non pullus rosmari, an animal Dugong" (Buff. 205, 245, tab. lvi). So that, after all, perhaps the *Auvekæjak* was only the young of the Walrus; and this opinion I am on the whole inclined to acquiesce in.

Fabricius enters, under the name of "*Mustela gulo,* L." (*Gulo borealis,* Retz.), an animal which the natives talked about under the name of *Kappik.* It was said to be found in south Greenland, among high mountains, particularly besides streams, and was especially fond of the hearts of Reindeer. He considered it to be the well-known Wolverine, the *Jerf* of Scandinavia (Norse *Arv, Erv,* and *Jærv*; Swedish *Jerf, Gerf*; Finnish *Kamppi* and *Kamppi-Karhu*).

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* Adelung: 'Geschichte der Schiffahrten und Versuche zur Entdeckung des nordöstlichen Weges nach Japan und China' (Halle, 1768) is the book Fabricius refers to. There is a wrong reference in F. G. to Adelung, viz. 189 for 148.

† Reinhardt, *loc. cit.* p. 8.

‡ Naturalists' Library, (Mammalia) vol. vii. (vol. xiii. of series), p. 220. M'Gillivray's Edin. Journ. of Nat. Hist. and Physical Sciences, Aug. 1838, p. 153; Hamilton in Nat. Lib. vol. viii. p. 102.

§ Bulletin Scien. Nat. vol. xvii. p. 280.

If so, it must be exceedingly rare, for since his time no one has been able to obtain or hear of a specimen. We more than suspect, however, that here, as elsewhere, he was only reproducing in a zoological dress the stories of the natives. So little was then known of the zoology of the Arctic regions, that he might well be excused for entering such animals in his fauna, there existing no reason why they should not be found in Greenland. If Fabricius could have lived to this day, he would have been the first to erase these from his list. The reason why I think so is this:—Under the head of "*Ursus luscus*" he has inserted a very doubtful and problematical animal, talked of long before his day, and equally so now, under the name of "*Amarok*" ("*Ursus luscus*, Eg.* 33, Cr.† 99, ex descriptione pellis ejus. Cf. Continuation.‡ 287, ubi dicitur subfusca, forsitan etiam veterum Hyæna Torf.§ 82"). This animal seems the same as that which he indicated in his fauna under the name of "*Mustela gulo*." He describes it as very fierce, corresponding in this respect with the character of the Wolverine. Depending upon the natives being in the habit of distinguishing animals by different names very clearly, he considered that *Amarok* and *Kappik* were different animals. Neither of them he appears to know anything about. I found the Greenlanders talking to this day about the Amarok all over Greenland; and wonderful stories they tell of its ferocity. It is the terror of the Greenlanders, as Fabricius truly enough remarks; everybody knew about it; but I could find nobody who had ever seen it‖. Graah¶ found the natives of the east coast equally familiar with the name of the *Amarok*; the name *Kappik*, however, was unknown in north Greenland.

Finally I discovered a man in Claushavn who declared he had seen the *Amarok*; it hunted in packs, he said; and this man made no secret of his belief that it was only native dogs which had escaped and returned to their wild state. In proof of this, he told me that, as frequently happens during the annual Reindeer-hunting-season, one of his dogs escaped and could not be captured again. Three years after, one severe winter, when "looking" his fox-traps, he found the identical dog captured, much subdued by hunger, but still very fierce after living for so long a period out of the reach of the merciless lash. It served its master for many a day after in harness. This man described the "Amarok" as all grey. It has been supposed to be the Wolf (*Canis occidentalis albo-griseus*), and to have crossed over the ice in Smith's Sound; but, from what I have said about the Eskimo Dog, it will be apparent that to distinguish between a wild Dog and a Wolf is a matter of some difficulty. I think, therefore, that you will agree with me that the Wolverine has no place in the Greenland fauna, and that the Kappik[*] and Amarok must be regarded as synonyms of *Canis familiaris*, var. *borealis*, tinctured with a deep hue of fable. Murray portrays the distribution of the glutton (*Gulo borealis*) on both the east and west coasts of Greenland up to nearly 67° N. lat.[†]; but if I am right in excluding this animal from the Greenland fauna, this distribution is erroneous.

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* Description of Greenland, Eng. transl.

† History of Greenland, Eng. transl.

‡ Continuation of the above.

§ Grœnlandia Antiqua.

‖ Mr. Tegner informs me that one of the natives declares that in July 1867 he saw the marks of the foot of an Amarok at the head of the Tessiursak, an inlet near Claushavn.

¶ *Lib. cit.* p. 90.

Here I may remark, what must by this time be self-evident to you, that the Greenlanders cannot be relied upon (independently of the principle in the abstract) for the names of animals. They are not the excellent cetologists we have always been led to suppose, confounding as they do several animals under one name, as I shall have occasion to notice at a future time when discussing the errors which Fabricius was led into by trusting too much to their nomenclature, and which to this time have entangled the history of the northern Cetacea in an almost pathless maze. Fabricius has notified in his Fauna many species of supposed Seals &c. under various Eskimo names, but which he was unable to decipher[‡]. Hr. Fleischer, Colonibestyrer of Jakobshavn, has aided me in resolving these:—

1. *Siguktok*, "having a long snout and a body similar to *Phoca grönlandica*, perhaps *P. ursina*." This is apparently some Eskimo perversion, if they have been interpreted properly; for I am assured that it is only the name of the Eider Duck (*Somateria mollissima*).

2. *Imab-ukullia*, a Seal with a snow-white coat, "the eye presenting a red iris, probably *P. leporina*," is a rare albino of the Netsik (*Pagomys fœtidus*). The meaning of the word is the Sea-hare.

3. *Atarpiak* or *atarpek*, "the smallest species of Seal, not exceeding the size of the hand, of a whitish colour, and a blackish spot of the form of a half-moon on each side of the body." This description does not correspond to the meaning of the word, which is "the Brown Seal." Hr. Fleischer thinks that it is only a myth, as is—

4. *Kongesteriak*, which has, "according to the description given by the natives, some resemblance to the Sea-ape described by Mr. Heller"[§]. This is one of the northern myths. The natives say it is a Bear which is so covered with an ice-coat that it never comes on land, but is always in the water, &c. These myths, both in the pseudo-Mammalia and in other groups, are endless; but I have given enough to show that no dependence can be placed on their idle superstitious tales.

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[*] Jansen in his 'Elementarbog i Eskimoernes Sprog til brug for Europærne ved Colonierne i Grönland' (Kjöbenhavn, 1862), p. 55, translates "Kappik" as "en Grævling."

[†] *Op. cit.* Map xxiv.

[‡] *Vide* also Giesecke in his "Greenland," in Brewster's Edinburgh Encyclopædia. This article, which is the only original one, as far as I know, ever *written* upon Greenland in the English language, is a most trustworthy account, for the time it was written. The author, however, copies Fabricius in all his errors as well as excellencies.

[§] I suppose Giesecke means *Steller's* account of the "Sea-ape," *vide* Pennant, Quadr. ii. p. 301 (*Trichechus hydropithecus*, Shaw, Zool. i. p. 247; *Manatus simia*, Illig.; *M.? hydropithecus*, Fischer, &c.).

I may as well close these notes on supposititious or non-existent animals by some remarks on other species, which though not mammals, yet come fairly under the headings I have given to this section of my paper. The Great Auk (*Alca impennis*, Linn.), once so common in Greenland, in the days of Egede, Cranz, and Fabricius, as, indeed, it was in many other parts of the northern portion of Europe and America, there can be little doubt is now quite extinct in Greenland. I made every inquiry regarding it, but could learn little or nothing about it. The natives about Disco Bay do not now even recollect it by name, though when the old Eskimo name of it (*Isarokitsoc*) was mentioned they immediately repeated it, and said, "Ah! that means little wings!" Though the Royal Museum in Copenhagen has offered large rewards for a specimen, hitherto their efforts have been in vain. One of the stories I was told at Godhavn, on Disco Island, if true, would afford some hope of its yet being found:—Eight years ago (1859), on one of the little islets just outside of the harbour, in the winter time, a half-breed named Johannes Propert (a nephew, by the way, of the well-known interpreter Carl Petersen) shot a bird which he had never seen before, but which, from description, could be no other than the Great Auk. He and his companions ate it, and the dogs in his sledge got the refuse; so that only one feather could afterwards be found. I know the man well. He is rather an intelligent fellow, and was not likely to destroy a bird of such rarity that he had never seen it before, when he knew that it would command a price from the Governor. Moreover Johannes bears the reputation of telling wonderful tales now and then. He says that he saw two, but that one escaped among the rocks. Mr. Frederick Hansen, Colonibestyrer (Governor) of Godhavn, has offered a reward for it, and is very sanguine that he will yet obtain a specimen of the *Geirfugl**.

Depending on the native stories of a jumping animal found in the southern part of Greenland, on grassy meadows, and called by them *Piglertok* ("the springer"), Fabricius thought that he recognized the Common Frog, and has accordingly entered the *Rana temporaria* as a member of the Greenland fauna. He, however, saw no specimens, nor is such an animal known in Greenland, where there are no species of Reptiles or Batrachians found. About the southern portion of Disco Bay, the natives use the name as a sort of *slang* title to the *Nisa* (*Phocæna communis*, Brookes), the *Marsvün* of the Danes in Greenland†, from its tumbling or springing movements while disporting itself. Jansen‡ gives the word in the south Greenland dialect as *pisigsartut* or *pigdlertut*, and translates it a Grasshopper (*græshopper*).

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* Swedish *Garfogel*, Norse and Icelandic *Geirfugl* and *Goiful.* It is also called in Norse *Stor-Ommer*.

† Called in Sweden *Marsvin* and *Tumlare*, in Finnish *Merisika*, and in Norse *Ise* and *Nise*, from which, apparently, the Eskimo name *Nisa* is derived, as are not a few of the Greenland words, from their intercourse with the old Norsemen prior to the Middle Ages. I suspect *Piglertok*, now the vulgar term, was originally the native one.

‡ *Lib. cit.* p. 59.

I will not stop to inquire into their grosser myths, which, though relating to animals, are yet only remotely connected with zoological science, and wander away into the domains of mythology, interesting enough, no doubt, but with which we as zoologists have but little to do. For instance, as far back as the days of Fabricius, they used to talk about men living away in the glens off from the coast. "They tell tales" (fabulantur), he says, "of other people living away among the mountains, rarely seen by them, never by the Europeans, whom they call *Torngit* or *Tunnersoit*, and even say that they have the appearance, stature, and clothing of Europeans. If they speak truly, which I am not in a position to deny, perhaps they are the remnants of the former Icelandic colonists, who have fled in among the mountains"*. About Jakobshavn they still talk of these people, and I collected many such stories. Some of these superstitions describe the *Torngit* as little men; and I know a man who says he saw one of these little men "pop out of a hole and in again" most agilely, and he tells a long story about it. Others describe them as tall men; so that these are undoubtedly only traditions of the old Norsemen. During the Norse possession of the country, the population appears to have got much amalgamated (as indeed we know, because when Paul Egede came, there were many traces of the white stock; and to this day there come down from the east coast natives with fair hair and blue eyes†) with the Icelandic adventurers who came with red-haired Erik, and subsequently imbibed much of their superstition. Indeed most of the best Eskimo traditions (as related by Rink in his 'Eskimoiske Saga og Eventyrn) are of Scandinavian parentage. Accordingly we find the old Norse tale of that fearful *Kraken*‡ which drew stout ships down to the bottom of the sea, in a Greenlandic version, still terrifying the squat seal-hunters who gather round the blazing *Kotlup* during the long winter nights; but I need say nothing further about it. It is one of the old *trols* of Scandinavia, familiar enough to all of us.

Still less will I stop to inquire regarding that "sea monster" which good Paul Egede saw, and Pastor Bing sketched "off our colony in 64° north latitude"§.

I have said enough to show that, though there is yet much to be done to the legitimate zoology of Greenland proper, there is still more to be done in what may be called the illegitimate zoology—the history of zoological myths and errors.

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* Fauna Grœnl. p. 4.

† A Moravian Missionary at Pamiadluk, near Cape Farewell, told Captain Carl W. Neilsen (who told me) that, in 1850, a party of natives came to that settlement from the east coast, and declared that it was two years since they had left their homes. They were described as tall and fair-haired. Almost every year some come down and permanently settle in the Danish colonies.

‡ *Kraken*, *Kraxen*, *Krabben*, and *Horven*, vide Pontopiddan, Nat. Hist. of Norway, vol. ii. p. 211; Ancker-Trold, Olaus, Wormius, Torfæus, &c.

§ *Lib. cit.* p. 86.

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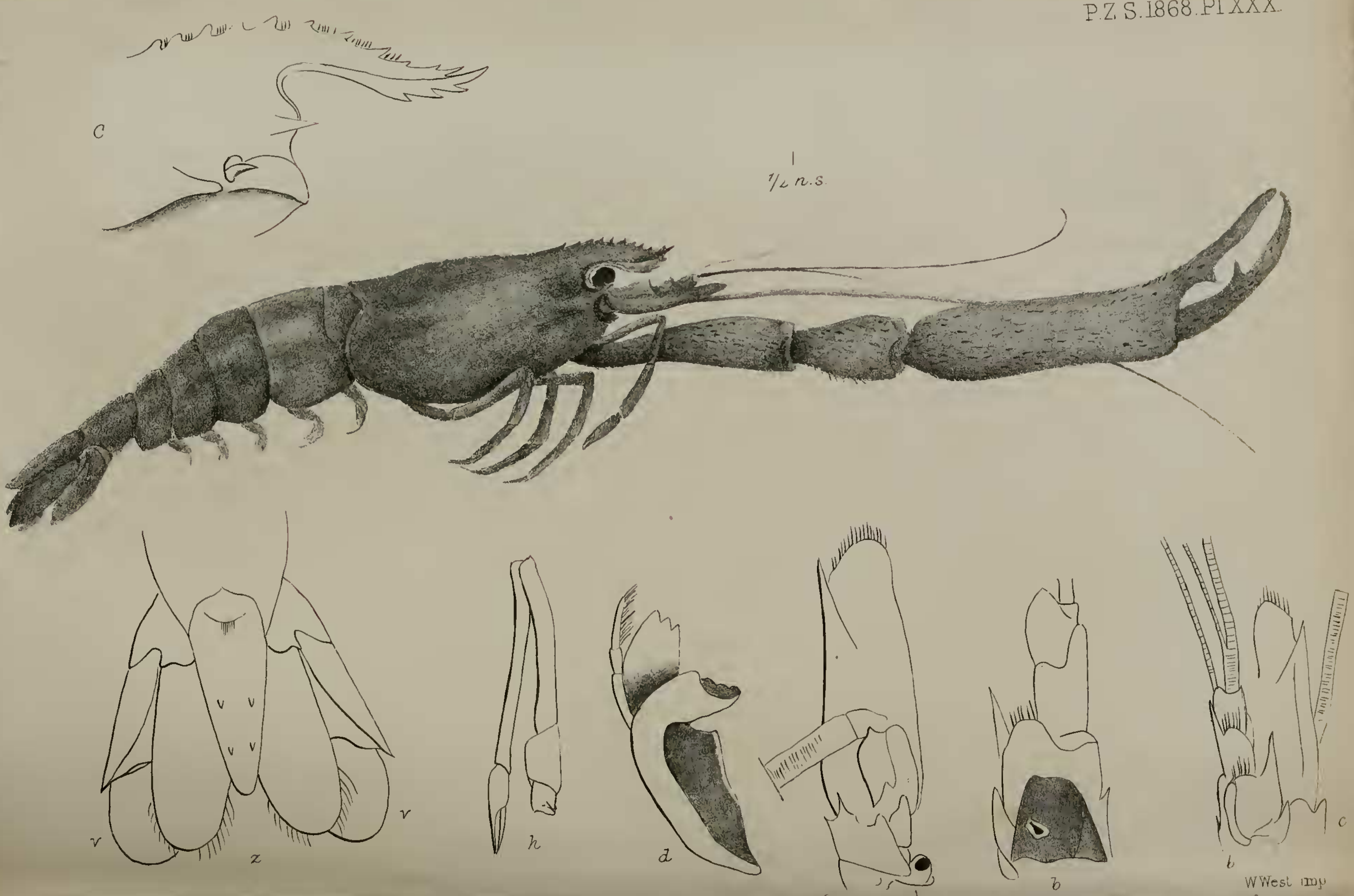
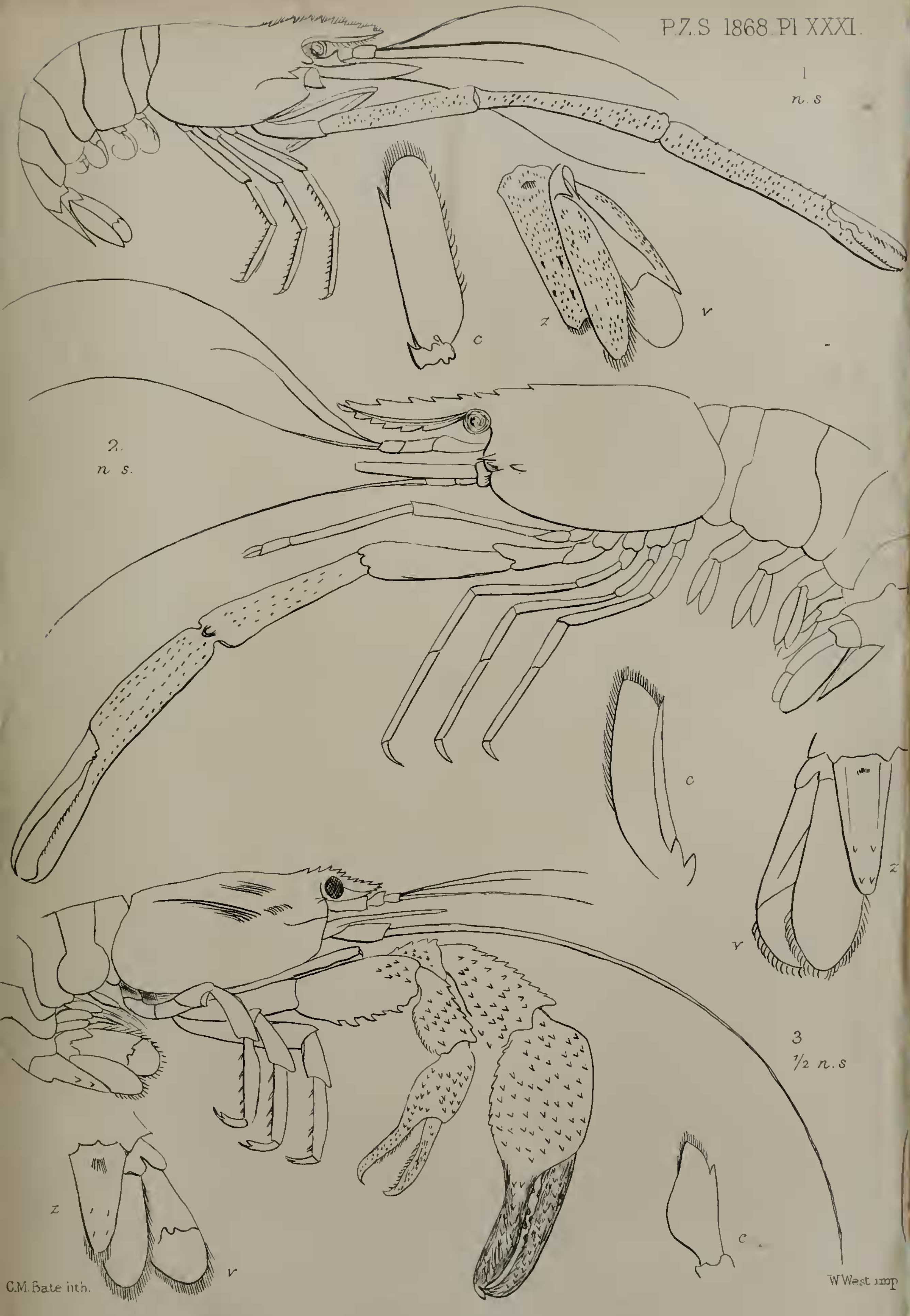
P.Z.S.1868.Pl XXX.



W West imp

P.Z.S. 1868. Pl. XXXI.



C.M. Bate lith.

W West imp.

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4. On a new Genus, with four new Species, of Freshwater Prawns. By C. SPENCE BATE, F.R.S.

(Plates XXX. & XXXI.)

MACROBRACHIUM, gen. nov.

Carapace armed anteriorly with a vertically projecting rostrum.

Eyes with short peduncles, not concealed beneath the carapace.

Superior antennæ having the first joint of the peduncle caved upon the upper surface; second and third joints cylindrical. Flagella three-branched, the smallest branch united to the largest.

Inferior antennæ furnished with a large scale; flagellum long and slender.

Mandibles having a molar and an incisive process, and furnished with a triarticular appendage.

Gnathopoda pediform.

First pair of pereiopoda slender, about as long as the carapace, didactyle; second pair immensely developed (in the male), longer than the entire length of the animal from the extremity of the rostrum to that of the telson.

Posterior three pairs simple, robust. Posterior pair of pleopoda longer than the telson. Telson triangular, terminating in a single point.

MACROBRACHIUM AMERICANUM, sp. nov. (Plate XXX.)

Carapace nearly half the length of the animal.

Rostrum short, armed above with eleven anteriorly projecting dental processes, of which the last four are posterior to the orbital margin of the carapace, and furnished with short, stiff hairs in the depressions between the teeth; below with three simple teeth. The rostrum has the anterior portion depressed, the apex being slightly elevated. Behind the margin, at the lower extremity of the orbit, is a single, sharply pointed tooth, behind and below which is a sharp spine or tooth that is surrounded at the base by a suture that passes from it on the anterior side to the anterior margin of the carapace.

Pleon deep, scarcely longer than the carapace.

Eyes globular. Superior antennæ having the peduncle scarcely longer than the rostrum; first joint half the length of the peduncle, inner surface flat, perpendicular, furnished with a single tooth near the centre of the lower edge, superior surface concave (for the lodgment of the eye); outer margin thinned out to a fine edge, furnished with a sharp, anteriorly directed tooth near the centre, and another at the distal extremity; the next two joints are short. The smallest flagellum united to the largest for about one-fourth of an inch from the base. Inferior antennæ having the peduncle about half the length of the superior. The large squamiform process nearly half as long again as the rostrum, furnished with an external subapical tooth. Flagellum about as long as the second pair of pereiopoda. Mandible having the incisive margin tridentate, the molar tubercle strong, prominent, and quadrate, and the triarticulate appendage not longer than the incisive process. Gnathopoda subequal, short, robust. First pair of pereiopoda slender, having the carpus longer then the meros, and nearly four times as long as the propodos, smooth. Second pair of pereiopoda half as long again as the entire animal, having the carpus shorter than the meros, and not half as long as the propodos; digital process turned inwards, armed within the centre with a large dental tubercle; dactylus meeting the digital process of the propodos at the extremity only, and armed near the centre with a large dental tubercle. The entire appendage covered with short spinous denticles, that are strongest on the inner surface and thickest on the digital process of the propodos, the dactylus, as well as the carpus, meros, and basal joints. Last three pairs of pereiopoda robust, spinous along the surface of the carpus, propodos, and dactylus. Posterior pair of pleopoda having the outer ramus biarticulate, the margins round and smooth. Telson shorter than the posterior pair of pleopoda, furnished with a fasciculus of hairs near the base, and two sublateral dorsal spines beyond the centre.

This very interesting and, from its great size, valuable Prawn, was obtained by Mr. Osbert Salvin from the Lake of Amatitlan, whence a considerable number are procured and brought to the markets in Guatemala. Its length, from the tip of the rostrum to the extremity of the telson, is about 9 inches; and in diameter it is about 5 inches. The length of the great claws is a feature that must separate this from the genus *Palæmon*, from which it is also distinguished by its less slender and graceful proportions. The colour of the specimen, as we have it dead, is of a brimstone-yellow, longitudinally striped with dark blue along the dorsal surface and on the sides of the pleon.

MACROBRACHIUM FORMOSENSE, sp. nov. (Plate XXXI. fig. 1.)

Carapace about one-third the length of the animal, having a rostrum nearly half the length of the carapace, armed above with eleven teeth, two of which are behind the orbital margin of the carapace, and furnished with short, stiff hairs between the teeth. Inferior margin smooth, fringed with short hairs. Behind the margin of the lower angle of the orbit is a sharp anteriorly pointed tooth, and obliquely behind and below is a second similar tooth. First pair of antennæ having the peduncle rather shorter than the rostrum, the first joint of which is about half the length of the peduncle, concave upon the upper surface, and furnished with a sharp distal tooth on the distal outer angle, and a row of hairs along the outer margin. The smallest branch of the flagella is united to the largest for about one-tenth of an inch. Second pair of antennæ having the squamiform appendage reaching beyond the rostrum, and armed subapically on the outer side with a short, sharp tooth. First pair of pereiopoda slender, long, having the carpus longer than the meros, and three times as long as the propodos. Second pair of pereiopoda half as long again as the animal, having the carpus longer than the meros and as long as the propodos, excepting the digital process; digital process curved slightly inwards, fringed with a row of hairs, and furnished with two dental tubercles within the centre. Dactylus curved; the apex crossing the extremity of the digital process of the propodos, and impinging against it through the entire length, fringed with a row of hairs and with a single tubercle. The entire appendage covered with small, yellow, transparent, spinous denticles. Last three pairs of pereiopoda moderately robust, and furnished with numerous small denticles along the inferior margin. Posterior pair of pleopoda roughened with small spines, as also the telson, which carries a small fasciculus of hairs near the base, and two small sublateral spines beyond the middle.

The length of this species is about 4 inches. It has recently been taken and brought home by Dr. Collingwood, who procured it from the River Tamsuy, in the Island of Formosa.

Macrobrachium gangeticum, sp. nov. (The Chingra.)

This species appears closely to resemble the preceding. I only know it through a drawing given to me by the late Colonel Hamilton Smith, who obtained it from a friend at Patna, a distance of 250 miles from Calcutta, where it was used as food, and was known under the name of "Chingra," the Hindostanee, I believe of "shrimp." Its length is about 6 inches, and the colour a bluish grey.

Macrobrachium longidigitum, sp. nov. (Plate XXXI. fig. 2.)

Carapace, including rostrum, nearly half as long as the animal. Rostrum about half as long as the carapace; upper surface armed with eight teeth, two only of which are behind the orbital margin. The teeth are widely separated from each other, and a few hairs are situated immediately anterior to each denticle. The lower margin armed with five teeth and a copious fringe of hair.

First pair of antennæ having the peduncle one-third shorter than the rostrum, the first joint of which is about half the length of the peduncle, concave upon the upper surface, and armed with a sharp distal tooth on the outer angle, and without conspicuous cilia along the margin. The smallest branch of the flagella attached to the largest for about one-fourth of an inch from the base. Second pair of antennæ as long as the animal, the peduncle being about half the length of the peduncle of the upper pair. Squamiform appendage not reaching to the extremity of the rostrum, and armed subapically with a small, sharp tooth, that does not reach beyond the cilia that thickly fringe the distal and internal margin.

First pair of pereiopoda long and slender, having the carpus longer than the meros, and three times as long as the propodos. Second pair of pereiopoda not quite as long as the animal, having the carpus a little longer than the meros, and the propodos, inclusive of the digital process, as long again as the carpus, the dactylus being half the length of the propodos, being pointed and curved at the apex, crossing when impinged against the curved margins of the digital process of the propodos, the entire appendage being thickly studded with small tubercles that appear generally to be ranged in longitudinal rows, of which those on the inner and lower sides are considerably the more prominent. Last three pairs of pereiopoda moderately robust, and furnished on the posterior margin of the propodos with a few equidistant solitary spines, and interspaced with hairs. Posterior pair of pleopoda having the denticle of the external plate not produced beyond the margin of the distal articulation. Telson smooth, slightly compressed, furnished with a depression and small fasciculus of hairs near the base, and two sublateral spines on each side beyond the middle.

The length of this species is about 5 inches. It has been in the collection of the Plymouth Athenæum for many years; but no habitat is recorded with it.

MACROBRACHIUM AFRICANUM. (Plate XXXI. fig. 3.)

Carapace half the length of the animal, rostrum depressed; apex slightly elevated, surmounted by nine small teeth, of which the anterior are the smaller, and only the posterior one behind the orbital arch; the interspaces furnished with short, stout cilia on the underside of the rostrum; near the apex are three small teeth; at the inferior angle of the orbit is a small, sharp tooth, between which and the infero-anterior angle of the carapace is a suture that passes to a considerable depth into the carapace, but its limit is not defined by a spine as is very generally the case in this genus. The superior antennæ have the peduncle nearly as long again as the rostrum, having the first joint as long as the other two, concave upon the upper surface, and produced into a strong spine upon the outer distal extremity. The smallest flagellum united with the largest to about one-eighth of an inch from the base. Inferior antennæ one-fourth longer than the animal; squamous process internally distended near the middle, receding towards the apex, which reaches nearly for one-half its length beyond the peduncle of the superior antennæ, and subapically armed with a tooth on the upper and outer side. First pair of pereiopoda are slender, and have the carpus longer than the meros, and four or five times as long as the propodos. Second pair of pereiopoda unequal, the right being considerably more long and robust than the left; but otherwise they resemble each other. The right leg as long as the animal, the left about one-third shorter; carpus about half the length of the propodos, minus the digital process, in the right, but nearly as long as the propodos in the left. Meros longer than the carpus, and both right and left thickly covered with sharp anteriorly directed spinous tubercles. Dactylus and digital process long and slender, armed at the extremity with a distinct spine, and along the inner margins with three corresponding tubercles. Posterior three pairs of pereiopoda robust, and furnished with numerous small spines on the dactylus and posterior margin of the propodos. Posterior pair of pleopoda having the articulation of the outer plate waved, and the denticulated process continuous with the outer margin of the second articulate margin ciliated, extremity of both plates round. Telson smooth, laterally slightly compressed; near the base on the central dorsal surface is a depression occupied by a small tuft of hair, and beyond the middle, on each side, are two short spines and a fasciculus of short hair.

Hab. Tambo River.

The near resemblance that these species bear to those of the genus *Palæmon* may induce some carcinologists to reconsider the propriety of making these species a genus by themselves. I am not aware that any structural distinction separates them from the genus *Palæmon.* There is, I think, however, in the enormous length of the second pair of pereiopoda, when compared with the same appendage in *Palæmon,* a strong *primâ facie* evidence that a separate generic distinction would form a very natural classification. I had, I must admit, some doubts upon the question, and hesitated in my opinion until I found that others, though closely allied in general form, yet specifically distinct in character, enabled me to see that the peculiarly distinguishing features that separated the species of this genus from *Palæmon* were sufficiently constant to warrant the adoption of the new genus. The convenience of this arrangement may also be seen in the peculiar and distinct habitat of *Macrobrachium,* the whole of the species yet known being lacustrine or fluviatile. I have only seen one or two specimens of each species, and these are all males. The development of the chelopods is so great in length that it must be difficult, if not impossible, for the animal to reach its own mouth with them; so that they can be of no use in feeding, for which purpose the first pair, being shorter, are more efficient. I believe it probable, but have not been informed, that in the females the chelopods are less monstrously developed.

It is something very remarkable that these Prawns, all of them so very large, living in freshwater lakes and rivers, in localities so very distant from each other as Central America and Central India, should bear so near a resemblance.

We are not aware that the same rivers or lakes have any other species of Prawn; and it would appear that the several species must have come from one common origin; for even the position and number of the spines on the telson, as well as the fasciculus of hair in the small depression at the base of the same, are common to all the species.

Whether or not there is anything remarkable in the form of their young or in the development of their larvæ I know not. The freshwater *Astaci* differ from their marine congeners in producing the young in a more advanced stage of development; but this appears not to be a constant law in freshwater Crustacea. In a small freshwater Prawn from the rivers of the island of Mauritius, that has been sent to me by Dr. Power, the young undergoes a change of form similar to that of the marine species.

I look upon the discovery of these edible Crustacea as being among the most fortunate of recent carcinological observations. Their great size would well adapt either of the species for culinary purposes if any one could be induced to acclimatize the species to our own lakes and streams. This appears to be the more easy in regard to the species from America, since the Lake Amatitlan is at so lofty an elevation as to be of a very low temperature.

DESCRIPTION OF PLATES XXX. & XXXI.

Plate XXX.

Macrobrachium americanum. c. Rostrum. *b.* Superior antennæ. *c.* Inferior antennæ. *d.* Mandible. *h.* First pair of pereiopoda. *v.* Posterior pair of pleopoda. z. telson.

Plate XXXI.

Fig. 1. *M. formosense.* *c.* Scale of inferior antennæ. *v.* Posterior pair of pleopoda. z. Telson.
2. *M. longidigitum.* *c.* Scale of inferior antennæ. *v.* Posterior pair of pleopoda. z. Telson.
3. *M. africanum.* *c.* Scale of inferior antennæ. *v.* Posterior pair of pleopoda. z. Telson.

5. On a supposed new species of *Galeocerdo* from Southern Seas. By J. D. Macdonald, M.D., F.R.S., and Mr. Charles Barron, Curator of the Haslar Museum.

(Plate XXXII.)

The following observations on a species of *Galeocerdo*, from the Australian coasts, are based on two jaws and a portion of skin preserved by F. M. Rayner, Esq., Staff-Surgeon, R.N., together with notes and measurements made by him, and drawings made by Dr. J. D. Macdonald, R.N., from the recent animal.

On reviewing the literature of the genus *Galeocerdo* it would appear that, comparatively, few specimens have actually been obtained for scientific examination, as the great authorities on this group of fishes, Müller and Henle, only mention two examples of the southern Tope (*G. tigrinus*), and two of the northern (*G. arcticus*), with several jaws; and the British-Museum Catalogue of the *Chondropterygii* only includes one specimen of the former and three jaws of the latter species.

When we compare the external characters of the two known species, as given and depicted by Müller and Henle, with those of the present Shark, we find the proportions of the body and fins of *G. arcticus* (Müller and Henle, pl. 24) to agree best with it; but in the colour of the skin there is great difference, and the scales represented in the plate alluded to are approximated and slightly imbricated, besides being relatively broader and more distinctly three-keeled than those of our fish. Moreover, although the teeth figured

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